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THE VERTEBRATE FAUNA OF MAGGS MOUNTAIN, TASMANIA

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ABSTRACT

The vertebrate fauna in an area of Tasmanian highland forest are outlined with some observations on the initial effects of the clear-cut method of tree harvesting. Pathological data from material collected are included.

INTRODUCTION

Tasmania has extensive forest resources. Great areas have been logged selectively for sawlogs for one hundred years and the resultant forests are largely degraded. At most altitudes eucalypts regenerate better under a system of clear-falling where the growth of young trees is not inhibited by a residual forest canopy. Thus the continuance of commercially valuable forests at a maximum level is dependant upon the removal of most of the remaining canopy.

Since 1972 handsome financial returns have attracted a woodchip industry and a great proportion of the previously uncommercial forest now is being harvested for this purpose. Three major companies are extracting and exporting woodchips. Large financial investment has permitted the introduction of additional modern machinery and log handling equipment. Roads and processing plant have been developed to handle the increased volume. Forest management plans are well advanced and controlled cutting is being undertaken on government-owned land and some private areas.

The harvesting methods adopted and the greatly increased areas involved have created public dissension about the effects of such operations. The arguments for and against have been published and debated at length. Increased and recurrent forest usage which create financial profits are advanced on the one hand, while the dangers of creating an ecological imbalance and reducing aesthetic qualities, possibly beyond redemption, are alternatively argued.

Under the present silvicultural practice of limited compartment cutting and regeneration by slash, burn and manual re-seeding or planting with softwoods, the future forests will become principally a patchwork of even-aged stands. These will produce long-term timber crops to be harvested in rotation, in a somewhat similar system to many of the intensive farming units now producing grain, fruit or meat on land which once supported fine eucalypt forests.

The long-term effects upon the ecosystem as harvesting continues and its effects expand cannot be predicted. Undoubtedly, there will be many problems, both silviculturally and zoologically, as harvesting proceeds on such a scale. Animal survival is primarily dependent upon three requirements: food, shelter and breeding conditions. Species lacking a habitat containing all three or, in the case of more mobile species, habitats sufficiently close to allow individuals to commute between areas supplying these requirements, are eventually doomed to local annihilation. An imbalance in forest fauna is a threat to the eventual standard of the forest.

The arguments raised for or against the projected timber industry cannot, at present, be supported by indisputable evidence or scientific knowledge. Therefore decisions are mainly based upon logical deductions formed from the limited data presently available. Without further studies to provide the necessary information, no one can accurately assess the detrimental or advantageous effects.

Aims

In 1974, a programme was commenced to collect some of the fauna destined to be disrupted in the course of forest harvesting and to gather related data from associated fauna studies. The main objectives were to improve the Queen Victoria Museum's reference collections and to gather some basic information about forest fauna which might assist studies on wildlife and forest management. The following programme was to be followed:

1. Sampling zoological and botanical material.
2. Identifying species present and assessing their abundance at different times of the year.
3. Determining species distribution based upon habitat dependence.
4. Gathering data on food requirements, breeding, and support systems.
5. Observing and recording changes in faunal populations as forest harvesting and forest regeneration progressed.

This was to be undertaken as a part-time operation and as part of general field work. Therefore, the time available was limited to about one week each month.

Eighteen visits, totalling sixty-four days, have been made as follows: In 1974, 2-5 September, 14-18 October, 12-14 November; in 1975, 17-21 February, 24-27 March, 8-12 September, 13-17 October, 10-14 November, 8-12 December; in 1976, 12-14 January, 16-19 February, 15-19 March, 12-15 April, 10-14 May, 21-25 June, 2-6 August, 30 August - 3 September, 27 September - 1 October.

THE STUDY AREA

Physical Features

A number of potentially suitable areas in the north and east of the state were inspected during the winter of 1974 before a decision was made in September of that year to establish a field station on the northern slope of Maggs Mountain (see map and plate 1). The site was selected because it provided a good range of commercial forest habitats, was well serviced by roads and where forest harvesting was being undertaken. Additionally, a Forestry Commission building was available for accomodation and laboratory work. The area selected for study was approximately triangular and included the northern half of Maggs Mountain, from east to west between the Mersey River and the Arm River and north to south from the Borradaile turn-off to a line running west from Rowallan Dam.

The general topography is steep and mountainous, being cut by steep-sided valleys which tend to physically isolate sub-alpine plateaux. Maggs Mountain (lat. 41°41'S; long. 146°12'E. Map, and plate 14) is on the western side of the Mersey Valley and about 60 km south of Ulverstone. Its plateau is 880 m above mean sea level, the northern end, where the field station was established, slopes steeply down to the Arm River which, at that point, is 420 m above mean sea level. The field station is at an altitude of 450 m. Soil on the plateau is alluvial sand, gravel and talus which overlies basalt and related rock types. The Mersey River has been dammed at two points for generating electricity. Rowallan Dam is about 5 km up river or south of the field station and Parangana Dam is about 7 km down river or north of the field station. The dams have created two long narrow freshwater lakes to the south-east and north-east of the study area.

Climate

The winter climate is severe with temperatures falling as low as –12°C. Mean temperature for July is 2°C. Snowfalls are common and up to 30 cm of snow may cover Maggs Mountain plateau for several consecutive days before thawing commences. Elevated areas having a southern aspect or otherwise sheltered from the sun may carry snow patches for several weeks. Low cloud and mist often envelop the area.

In summer the temperature rises to 35°C with a mean for January of 10°C. Annual preciptation averages 160 cm, little of which falls in the summer months.

Under these conditions the ground cover dries out and periods of high fire danger usually occur between January and March.

VEGETATION

Timber cutting for saw logs has been undertaken in the area for many years and recently the more intensive forest harvesting practices have been introduced. These operations have contributed to a diversity of habitat types within the study area ranging from sub-alpine rainforest to wet sclerophyll and dry sclerophyll forest, grassland and areas at various stages of regeneration. Logging operations and reafforestation are continuing. The following brief descriptions and accompanying botanical lists broadly illustrate the habitat divisions under which data has been assembled and to which reference is made in the annotated fauna list.

Rainforest (plate 2)

In well matured stands, dominance is generally established by Myrtle *Nothofagus cunninghami* which forms a dense forest canopy about 50 m above ground and which shelters and shades the damp, moss-covered understory and forest floor where sunlight penetrates only through occasional breaks. In sub-climax rainforest, as is often the case in the study area, occasional overmature Stringybark *Eucalyptus obliqua* and Gum-topped Stringybark *E. delegatensis* may surmount the Myrtle canopy and stands of Silver Wattle *Acacia dealbata* may persist. Sassafras *Atherosperma moschatum* occurs regularly and, along the drainage system, Tree-fern *Dicksonia antarctica* grows prolifically, often attaining a height exceeding 3 m.

The forest floor is covered by a deep accumulation of leaves, twigs, branches and logs which remains for extensive periods due to the general absence of fire and the slow rate of decay. These accumulations, together with the trunks and lower limbs and branches of trees, are usually well covered with mosses and lichens and form natural cavities and shelter for small animals.

Wet sclerophyll forest (plate 3)

Dominant forest canopy species include Gum-top Stringybark *E. delegatensis*, Stringybark *E. obliqua*, White Gum *E. dalrympleana* and Silver Wattle *A. dealbata*, the upper canopy reaching to 70 m above ground. The understory, shrub layer and ground cover form a mixed vegetation, often comprising many species favoured as a result of logging at some former period and currently forming an early succession stage which would climax as rainforest were it given suitable protection and time to mature. Consequently, juveniles of rainforest species such as Dogwood *Pomaderris apetala*, Warratah *Telopea truncata*, Mountain Berry *Cyathodes parvifolia*, Fire Weed *Senecio linearifolius* and Mountain Pepper *Drimys lanceolata* usually are present.

A botanical collection, assembled from an area of wet sclerophyll-rainforest at the turn-off to the Borradaile Plains in September 1974 and now housed in the Queen Victoria Museum Herbarium, is listed in table 1.

Dry sclerophyll forest (plate 4)

White Gum *E. dalrympleana*, Peppermint *E. radiata* and Gum-top Stringybark *E. delegatensis* form the forest canopy, growing to a height of up to 70 m. Blackwood *Acacia melanoxylon* and Silver Wattle *A. dealbata* are interspersed as an understory in some areas, the latter regenerating readily in clumps when clearings are made by logging or fire. The shrub layer is relatively sparse and the forest floor relatively clear, often as a result of burning of the accumulated natural forest litter. Ground cover regenerates quickly, rushes *Juncus* sp., grass *Poa* sp., and bracken *Pteridium esculentum* being the main components.

A botanical collection, assembled from dry sclerophyll forest near the field station in September, October and November 1974 and now housed in the Queen Victoria Museum Herbarium is listed in table 2.

Regeneration (plates 5 and 6)

The area under observation in this category is Compartments 3 and 4 on the plateau of Maggs Mountain, at an altitude of 880 m. It was last logged about 1961 and burnt in March 1962, reseeding being by natural fall from the seed trees left standing. Sparse stands of pole timber have developed in some areas, interspersed with a few old over-mature eucalypts. It now supports a dense regrowth of Stringybark *E. delegatensis* and White Gum *E. viminalis* standing to about 6 m high. Mountain Pepper *D. lanceolata*, Silver Wattle *A. dealbata* and Mountain Berry *C. parvifolia* are prevalent in the shrub layer. Grass *Poa* sp. is the principal ground cover, forming a dense mat over much of the surface.

Odd patches of juvenile Celery-topped Pine *Phyllocladus aspleniifolius* and Beech *N. cunninghami*, and the general proximity of stands of Beech-dominant rainforest suggests that this area was once part of an extensive rainforest much of which, having been logged to varying degrees, is now in an early stage of succession.

A botanical collection from this area in September, October and November 1974, held in the Queen Victoria Museum Herbarium, is listed in table 3.

Clear-cut (plates 7 and 8)

This area is Compartment 2 on the plateau of Maggs Mountain, adjacent to the regeneration (Compartments 3 and 4) previously discussed, and to areas of wet sclerophyll forest and rainforest. It consists of a rectangular block about 1.6 by 0.65 km (104 ha) of gently sloping ground at an altitude of about 880 m. Previously an area of wet sclerophyll forest and rainforest, it was logged in 1973. The remaining trees were felled and the shrubs bulldozed down in 1974. The whole area was burnt on 17 February 1975 (plate 7) and sown in May 1975. Burning left a bed of ash over soil broken up by bulldozing operations but many big limbs and trunks failed to burn completely and so remain covering much of the area. Some patches of grass in clearings and odd green heads of Myrtle *N. cunninghami* did not burn. Botanical specimens were collected in this compartment in February 1976. They are listed and relative abundance given in table 4.

The western edge is bounded by a control area 0.4 by 0.65 km (26 ha) (plates 9 and 10). It was logged with the rest of Compartment 2 but then left and not clear-cut or burnt.

Additional observations have been made in a similar habitat in the northern sector of Compartment 57 (plate 11) where an area of about 20 ha was clear-cut, burnt and sown at the same time. It is a section of the floor of the Arm Valley and supports some tea-tree scrub and areas of swamp and rushes.

METHODS

The problem of assessing abundance has been considered and discussed with other field workers. It was decided that in the present study, which because of other commitments was limited to mainly collecting specimens and associated data, relative abundance would be assessed from general field observations aided by any data collecting methods which might improve the reliability of the result. To achieve this, regular visits were made on a monthly basis from September 1975 to September 1976 and on each occasion specimens were collected and notes made on the occurrence of fauna. This method may not be acceptable to some but it is supported by the field experience of the author which spans a period of over forty years. The general knowledge of fauna, gained from training and field experience not often available to others, has greatly assisted the evaluation of data collected by general observations, spotlighting, trapping, netting, tracking and the identification of faeces and calls. Some of these indicators of presence or activity are often inapplicable by those who use entirely statistical methods in population counting. At the same time, allowances have been made for bias caused by influences of food, breeding, weather, migration and habitat preferences. Relative abundance has been chosen in preference to number-per-hectare because, in the present circumstances, it was not possible to devote the time necessary to undertake a more detailed statistical assessment. It also allows for consideration of the additional indicators, discrepancies and biases previously mentioned and gives a meaningful and useful result by being the average for the general area and not restricted to the limitations of data collecting in a study plot.

Mammals

Observations were carried out at night aided by spot-lighting with a narrow beam lamp. Regular patrols were made by vehicle along logging roads and by walking along tracks and across clear-cut areas. Some marsupials were collected by shooting on most excursions. An estimated 30 hours, covering 500 kilometres of road patrols and 15 hours covering 20 kilometres of walks were made in these spot-lighting operations.

Trapping has been undertaken to establish the presence of some species of small animals. Wire cage traps (45 x 20 x 20 cm), Sherman tin box traps (23 x 9 x 8 cm) and breakback household rat traps were used. These were set for 450, 120 and 1200 trap nights respectively. Bait was used on all occasions and consisted of bread spread with peanut butter and honey. Fresh apple was used in conjunction with the bread bait in the cage traps and box traps. Mist nets were left set overnight for bats on four occasions during the summer of 1975-1976. The relative prevalence and distribution of faeces, footprints, digging, scratching and runways, together with severity of grazing and browsing were all considered in arriving at conclusions.

All mammals collected were searched for ectoparasites which were preserved in alcohol. All small mammals were preserved in 70% alcohol or 4% formalin. Of the large marsupials, only the skulls were retained after the animals were examined. Muscle samples were cut from most mammals and formalin-fixed for pathological examination (see appendix).

A list of the mammals recorded and their relative abundance in five habitat types is given in table 5.

Birds

The relative abundance of species in the classified habitats was recorded on each visit and an index number was given to each to denote its status (see tables and). This was assessed by observations, aided by 7 x 50 binoculars, by listening to birds calling and by random mist netting. Consideration was given to circumstances which could produce local bias, such as seasonal flocking, feeding congregations and weather. The secretive nature of some species, relative to those which are more conspicuous, was also taken into account. As much time as possible was devoted to these observations and the various influences considered before arriving at an assessment.

Specimens were collected by shooting with a 16 gauge shot gun and a .22 cal. rifle using both solid and dust shot cartridges. Random mist netting was undertaken to obtain additional specimens and distributional data. Up to six nets (40' by four shelf, 1¼" mesh) were worked at irregular times, totalling about 1000 mist net hours.

All birds collected were searched for ectoparasites which were preserved in 70% alcohol. The gut contents of all birds were extracted and preserved in 70% alcohol. A muscle sample was cut from the breast of each specimen and formalin-fixed for pathological examination (see appendix). Most birds were preserved in 70% alcohol, the exceptions being made into study skins.

A list of the birds recorded and their relative abundance in six habitat types is given in table 6. Their status and seasonal occurrence is given in table 7.

Amphibians

Frogs, tadpoles and eggs were collected by hand, fixed in 4% formalin and preserved in 70% alcohol. Records were kept of frog calls.

A list of species recorded in five habitat types is given in table 8.

Reptiles

Snakes and lizards were collected by shooting or by hand at every opportunity. All the lizards and most of the snakes were fixed in 4% formalin before preservation in 70% alcohol. Some snakes, not preserved, were passed to the Department of Agriculture for pathological studies (see appendix).

A list of the species recorded in five habitat types is given in table 8.

Fish

Other than casual observations and some hand collecting in the shallow water of the Mersey River, no work has been undertaken on the fish.

Invertebrates

These were collected as opportunity permitted but special emphasis was placed upon fauna living in the foliage of Silver Wattle *Acacia dealbata* and *Eucalyptus* spp. A series of samples has been collected in each month from September 1975 to May 1976. To gather specimens, a 45 litre plastic trash bin was held beneath the lateral foliage. The lid was then used to depress and beat the foliage into the top of the container and dislodge the animals. A small wad of chloroform soaked cotton wool in the bottom of the receptacle retarded escape. Each sample was preserved in 70% alcohol.

Botany

Samples were collected from a number of areas and habitat types. All were mounted and incorporated in the Queen Victoria Museum Herbarium.

Nomenclature

The nomenclature followed for mammals is that used by Green (1973); for non-passerine birds, Condon (1975); for passerine birds, Schodde (1975); for amphibians, Littlejohn and Martin (1974); and for reptiles, Rawlinson (1974). The terms rare, uncommon, common and abundant provide four broad categories of abundance, each group being designed to differ from the next by about tenfold.

THE FAUNA

The present faunal list and associated discussion is designed to record habitat preference, relative abundance, seasonal occurrence, and some breeding and behavioural data. This will describe the pattern of the present faunal distribution against which future trends may be measured. The broader reasons for the occurrence of some species in the different habitat types may appear fairly obvious but, for most, considerable investigation is required before their support systems can be understood. Habitat preference is sometimes confusing because there are always transitory individuals investigating habitats which are not of their natural environment. In assessing status in a particular habitat, it was considered important to differentiate between casual visitors, transitory species and residents which live and reproduce there.

Mammals

Brush Wallaby *Macropus rufogriseus*

Abundant throughout the areas of sclerophyll forests but less so in the rainforest. It leaves its diurnal cover at dusk to feed in grassy clearings and the verges of roads and logging tracks where it is easily observed by spotlight. It is also attracted to the clear-cut areas which provide an enhanced food supply after grasses and shrubs commence to regenerate in the first summer following burning. These areas are then invaded from the surrounding forests. Regenerating *Eucalyptus* spp. are often damaged severely by mammals, possibly this species, which prune the young trees to biting through the twigs, leaving the leaves trampled on the ground. In the autumn it would be normal to see five to ten per hour by spotlighting along roads, tracks or across clear-cut areas. After the opening of the hunting season about June, the number is reduced by shooters taking wallabies for their skins and meat.

Tasmanian Pademelon *Thylogale billardieri*

Abundant, occurring in areas of rainforest, wet sclerophyll forest and the dense vegetation of valleys. At dusk, it leaves this diurnal shelter to feed in forest clearings and grassy verges and is easily observed by spotlighting. It is attracted by the enhanced grazing in clear-cut areas which it invades to feed under cover of darkness, possibly contributing to damage of young *Eucalyptus* spp. by pruning in the same manner as mentioned for the preceding species. Its population appears about similar to that of the Brush Wallaby and it is seasonally hunted and shot for its skins and meat along with that species.

Southern Potoroo *Potorous apicalis*

Common but with a patchy distribution in the sclerophyll forests where it forms runways beneath the dense vegetation and builds nests of grass and litter in which it rests. It is occasionally seen by spotlight at night, in partial clearings or on roadsides but is shy and does not venture far from cover. Though common and easily trapped in restricted areas, it is generally less plentiful than the Brush Wallaby and Tasmanian Pademelon. It has no commercial value and is totally protected by law.

Brush Possum *Trichosurus vulpecula*

Abundant throughout the whole area, living in all habitat types. It retires by day to holes in trees, logs or other refuges. It becomes active at dusk, spending most of the night on or near to the ground but, if pursued, it will usually escape by climbing into trees. Its food consists mainly of grasses, herbs and shrubs but the foliage of *Eucalyptus* spp. is also eaten. It damages some young trees and sprouts by browsing on the juvenile leaves. Black and grey animals occur in the population in approximately equal proportions. In autumn it would be normal to see ten to fifteen each hour by spotlighting along roads and tracks and in the clear-cut areas. During the winter hunting season it is shot using spotlights. Considerable numbers are taken in the study area and throughout the district generally for their commercially valuable skins. This noticeably reduces the population density until replaced by natural reproduction in the following year.

Common Ringtail *Pseudocheirus peregrinus*

Uncommon throughout the area but occurring everywhere except in treeless clearings. It hides by day in a nest composed of twigs and leaves, situated well above ground in a tree hollow or amongst dense foliage. It is almost totally arboreal, rarely descending to the ground, and feeds by browsing on the young shoots of trees and shrubs. It is therefore rarely seen in the headlights of vehicles but can be found by spotlighting, from as low as a few feet to high in the branches of the tallest trees. Individuals and pairs have been found in tea-tree in the Arm River valley and in both wet and dry sclerophyll forest on the slopes of Maggs Mountain. It has not been subjected to a hunting season for about 35 years.

Sugar Glider *Petaurus breviceps*

Rare. Only one animal has been observed by the author. This was by spotlight, high in the upper foliage of a *Eucalyptus* sp. in wet sclerophyll forest on the north-western slope of Maggs Mountain. Hunters say they occasionally find Sugar Gliders in the area when spotlighting for Brush Possums. It is almost totally arboreal, retiring by day to a tree hollow where it forms a nest of leaves gathered from *Eucalyptus* spp.

Eastern Pigmy Possum *Cercartetus nanus*

Rare. It has not been observed by the author but hunters say they occasionally see individuals when spotlighting for Brush Possums. They are said to be found on limbs and branches well below the canopy.

Common Wombat *Vombatus ursinus*

Common throughout the sclerophyll forests and clear-cut areas where it retires by day to burrows and hollow logs. It is occasionally seen in vehicle headlights and when spotlighting, grazing on the verges of roadways and in forest clearings. In clear-cut areas its presence is often disclosed by its scratchings and faeces.

Brown Bandicoot *Isoodon obesulus*

Common in the areas of sclerophyll forest where it can be easily trapped on the edges of small clearings or along tracks. By day it retires to a domed grass nest which it forms in a depression in the earth amongst dense vegetation. It is occasionally seen on the verges of roadways in the headlights of a vehicle and its diggings, made while searching for food, are often found in grassy clearings.

Tiger Cat *Dasyurus maculatus*

One was seen on the 18th February 1976, sunning itself on a log, in dry sclerophyll forest and regrowth in the vicinity of the field station. Faeces and the occasional remains of eaten rabbits consistent with the activity of this carnivorous marsupial, also are indicators of its presence in the area. No nocturnal sightings have been made but hunters and timber cutters say they see it occasionally.

Tasmanian Devil *Sarcophilus harrisii*

A half-grown male was caught in a cage trap set in an open situation near the field station on the 14th November 1974. No other individuals have been sighted and discarded mammal carcasses are not noticeably scavanged. Faeces consistent with those of this marsupial are occasionally seen but its presence in the area may well be due to transient individuals originating from agricultural areas lower down the Mersey Valley.

Dusky Antechinus *Anthechinus swainsonii*

This marsupial has previously been found to occur commonly in rainforest and adjacent wet sclerophyll forest (Green, 1972). One has been caught in rainforest while trapping at Maggs Mountain and it is probable that its distribution and population here are similar to those in other such areas.

Eastern Swamp-rat *Rattus lutreolus*

Abundant in the rainforest and wet sclerophyll forest but less so in the dry sclerophyll forest. It forms runways and burrows beneath dense vegetation and is primarily vegetarian, being readily caught in traps baited with bread or apple. Despite its general occurrence it is rarely observed in the wild and does not enter buildings as do the introduced species.

Water Rat *Hydromys chrysogaster*

One was found road killed in the Arm River valley in September, 1974, and the species probably occurs sparsely throughout the drainage system.

Long-tailed Rat *Pseudomys higginsi*

Common in the rainforest and to a lesser degree in adjacent ecotonal areas. It hides by day in burrows, natural cavities in the forest floor or holes in decayed stumps and logs. It is omnivorous and forages over the forest floor for suitable items of food. If disturbed it quickly retreats to cover. Trapping in rainforest at Maggs Mountain yielded catches indicating populations consistent with those described by Green (1968). The habitat in Compartment 2, prior to cutting, was suitable for this rat and no doubt supported a population similar to those in other areas. When trapping there in June 1976, 17 months after the controlled burn, four were caught in sixty snap traps left set in the same sites for three successive nights. The habitat in which these rats were living is inconsistent with previous findings. It is believed that they were part of the original population, which had survived the burn by hiding in burrows and then were unable, or unwilling, to move to other habitats.

House Mouse *Mus musculus*

One was seen on a road when spotlighting on the plateau of Maggs Mountain and several were trapped on the northern slope in November, 1975. Both sites were several kilometres from the field station in wet sclerophyll forest. In May, 1976 five were trapped in and beneath the field station building, and in

June, 17 were caught in 180 trap nights on the clear-cut in Compartment 2.

Rabbit *Oryctolagus cuniculus*

Abundant along roadways, in clearings in the sclerophyll forest and in the areas of grassland in the Arm River valley (plate 12). It hides by day beneath vegetation or in shallow burrows and emerges at night to feed on the grassy verges and closely grazed areas. Roadways provide corridors through the forest and it uses these to expand its range and to penetrate newly cleared areas. Consequently clear-cut areas are soon invaded and there it thrives in the temporary grassland habitat. Though sightings are not common, its numbers are indicated by frequent scratchings in the earth and accumulations of faecal pellets. Black individuals form about 20 per cent of the population.

Lesser Long-eared Bat *Nyctophilus geoffroyi*

Two adults were taken by mist netting at dusk in the vicinity of the field station on 29th March, 1975. Odd bats occasionally are sighted while spotlighting but identification of these has not been possible.

Little Bat *Eptesicus pumilus*

An adult male was caught in a mist net left set overnight on 17th February, 1976.

Tasmanian Pipistrelle *Pipistrellus tasmaniensis*

Two adult males were shot at dusk at the field station on 18th February, 1976.

Feral Cat *Felis catus*

Uncommon in the area. Two individuals have been seen in the headlights of a vehicle and a road-killed cat was found on the plateau of Maggs Mountain.

Echidna *Tachyglossus aculeatus*

Common and regularly seen during spring and summer, rarely seen in autumn and never in winter. It occurs in all habitat types but favours the sclerophyll forests. Its diggings for food are commonly found.

Platypus *Ornithorhynchus anatinus*

Though not seen or collected locally, it no doubt occurs in the nearby Mersey River and Arm River.

Birds

Black Cormorant *Phalacrocorax carbo*

Singles, pairs or small parties were occasionally seen in flight, high above the Arm River. The species is known to breed in colonies in remote inland areas.

White-faced Heron *Ardea novaehollandiae*

One was present in trees on the edge of the Arm River in the northern sector of Compartment 57 and in the vicinity of the field station in March 1976.

Black Duck *Anas superciliosa*

One was disturbed at night from water-filled ruts in the clear-cut (Compartment 2) on Maggs Mountain plateau in September, 1975, a pair was flushed from a small drain in the clear-cut section of the northern sector of Compartment 57 in January, 1976, and a pair was seen flying above the clear-cut section on the Borradaile Plains on 2nd September, 1976.

Brown Goshawk *Accipiter fasciatus*

A pair was seen in flight at tree top height on the north side of Maggs Mountain in November, 1975. A pair was found nesting near the field station in September, 1976.

Wedge-tailed Eagle *Aquila audax*

The valley of the Arm River appears to be the centre of a territory occupied by a pair which have nested in a large *Eucalyptus* sp. in the bottom of the valley. One, or both, were often seen flying over the study area and in February, 1976 they were accompanied by a juvenile.

Peregrine Falcon *Falco peregrinus*

One was seen flying above Maggs Mountain in September, 1976.

Brown Falcon *Falco berigora*

At least one pair lives in the vicinity of the field station. Individuals have been seen fairly regularly, from the Mersey River to the Maggs Mountain plateau (Compartment 2). A party of three, seen on the edge of grassland in the valley of the Arm River (plate 12) in January, 1976 included a juvenile.

Spotless Crake *Porzana tabuensis*

The tea-tree swamp in the northern sector of Compartment 57 (plate 11) supports a small population. Crake-like footprints were plentiful and calling was heard in March, 1976. In April, one adult and one subadult were caught in snap traps set on runways in the grass.

Tasmanian Native-hen *Gallinula mortierii*

A pair of birds live on the grassy verges of a small swamp, now well exposed by the clear-cutting, on the northern sector of Compartment 57. One chick was seen in December, 1974 but it apparently failed to survive. Three halfgrown chicks were found with the adult pair in January, 1976 and all were surviving in May. A few live in the areas of grassland further up the Arm River Valley (plate 12) and good populations occur on pasture land lower down the Mersey River valley.

Masked Plover *Vanellus miles*

Two pairs were found living in the grassland area of the Arm River valley (plate 12) in August, 1976. Transitory birds are sometimes heard calling as they fly down the valley at night.

Brush Bronzewing *Phaps elegans*

This species has been seen on one occasion only, when one was flushed from the road side about a kilometre north of the field station in 1974. One was heard calling from the forest on the north side of the Arm River valley in January, 1976.

Yellow-tailed Black Cockatoo *Calyptorhynchus funereus*

Uncommon and nomadic. A group of about six birds was regularly seen in the wet sclerophyll forest and rainforest on the northern side of the Arm River valley opposite the field station, during the summer of 1974-75 but sightings were not so frequent the following year. Pairs and individuals have been seen in other scattered areas including the Maggs Mountain plateau. A pair was found to be nesting in the hollow trunk of a lofty *Eucalyptus* sp., at a height of about 30 metres, on the north side of Maggs Mountain, in December, 1975. Timber, both fallen and standing, which has been broken up by the powerful beaks of cockatoos in their search of wood-boring larvae, is common throughout the area and may be found in habitats ranging from the clear-cut to rainforest.

Sulphur-crested Cockatoo *Cacatua galerita*

A pair lived in the rainforest and wet sclerophyll forest in the Arm River valley, opposite the field station and in the same area as a party of Black Cockatoos, during the summer of 1974-75 and the summer of 1975-76. A single bird was seen once on the Maggs Mountain plateau. In March, 1976 three (apparently the original pair and a juvenile) were seen in Compartment 57 in the Arm River valley. Other localised populations are known in various parts of inland north-western Tasmania.

Green Rosella *Platycercus caledonicus*

Common and sedentary throughout the year, principally in the sclerophyll forests where it lives and feeds amongst the foliage of *Eucalyptus* spp. Green and Swift (1965) found psyllids belonging to the genus *Schedotrioza* were taken in quantity by rosellas cracking the galls on the foliage of *Eucalyptus amygadalina* at Greens Beach, northern Tasmania. They also make reference to the observations of others who found rosellas to be insect eaters. A small flock was observed feeding on the ripening seed heads of Fireweed *Senecio linearifolius* in Compartment 2 in May, 1976. During the spring, breeding pairs are dispersed throughout the forest and are relatively secretive. Outside the breeding season, this rosella forms loose flocks of about five to 20 birds which move through the forest in a noisy and conspicuous manner.

Blue-winged Parrot *Neophema chrysostoma*

Uncommon and migratory. Up to twenty were found living in the clear-cut in Compartment 2, in February and March, 1976. It was not breeding in the area.

Fan-tailed Cuckoo *Cuculus pyrrhophanus*

A common migrant, arriving in the area between late September and early October and departing again in February. During the intervening months it lives in the sclerophyll forests and calls regularly.

Shining Bronze-cuckoo *Chrysococcyx lucidus*

A common migrant, arriving here in October, and departing again in January and February. During this time it is widespread, occurring everywhere except in rainforest. Its presence often is disclosed by its regular calling.

Tawny Frogmouth *Podargus strigoides*

One bird was caught in a mist net at the field station in October, 1975.

Kookaburra *Dacelo novaeguineae*

Uncommon and sedentary in the sclerophyll forests. In winter it is less vocal and not so easily noticed.

Welcome Swallow *Hirundo neoxena*

A common migrant, arriving here in September and departing in February and March. It favours cleared or partially cleared areas and the verges of dry sclerophyll forest, rarely entering the forest canopy. Occupied nests have been found in November and December in buildings at the field station and beneath bridges in the area.

Tree Martin *Cecropis nigricans*

A common migrant, arriving in the area in late September and early October and departing again in March and April when migrating flocks are seen. It breeds in the area and reaches a population peak in December and January when the young birds are flying. Evening congregations on gravel patches at the field station in January and February numbered about fifty birds and their gravel pecking behaviour was similar to that described by Mollison and Green (1962). By March these congregations had reduced to less than ten birds.

It favours dry sclerophyll forest and cleared areas, and flies beneath the canopy where it nests in small cavities in the limbs and trunks of *Eucalyptus* spp.

Richard's Pipit *Anthus novaeseelandiae*

A rare migrant which occurs in the clear-cut areas when grasses are established. It is absent in winter. A single bird was found living in the clear-cut of Compartment 2 on the plateau of Maggs Mountain in November, 1975, ten months after the burn. A pair was found breeding in the grass-covered clear-cut in Compartment 57 in the Arm River valley in December, 1975. These man-made clearings are of a very temporary nature, the birds utilising them only until the regenerating forest renders them unsuitable.

Black-faced Cuckoo-shrike *Coracina novaehollandiae*

A common migrant which arrives in the area in late September and departs in early February. It usually occurs as singles or breeding pairs and lives mostly in the canopy and subcanopy of the sclerophyll forests.

Scaly Thrush *Zoothera dauma*

Uncommon and sedentary. Seen and heard on several occasions in wet sclerophyll forest and thick tea-tree. One was netted in May, 1976 in the area of open grassland surrounding the field station.

Pink Robin *Petroica rodinogaster*

Uncommon and localised. During the summer it is almost exclusively confined to rainforest and the associated ecotone where it breeds and feeds from near ground level to subcanopy. Outside the breeding season it is sometimes found in adjacent sclerophyll forest. It requires rainforest in which to breed and the reduction of this habitat as forest harvesting continues will progressively reduce its distribution and population.

Flame Robin *Petroica phoenicea*

An abundant migrant which arrives in the area in late August and September forming loose flocks and feeding at or near ground level, amongst trees and in clearings. Breeding takes place in November and December and birds are then dispersed in pairs throughout the dry sclerophyll forest. In 1976 much of local population had moved away by mid-January and only individual grey birds were then found. A secondary influx, possibly by exiting migrants, occurred in February, March and April but all had moved away by May.

Scarlet Robin *Petroica multicolor*

An uncommon visitor which arrives in late summer and departs in early spring to breed at lower altitudes. It occurs primarily in the dry sclerophyll forest and associated clearings.

Dusky Robin *Melanodryas vittata*

This endemic robin is common and sedentary, living in the dry sclerophyll forest and adjacent clearings. It is somewhat gregarious in the spring and autumn and is then most conspicuous. Here breeding is generally later than in the lowlands, the birds being dispersed in breeding pairs and most secretive about November and December.

Olive Whistler *Pachycephala olivacea*

Common, sedentary and widespread occurring primarily in the wet sclerophyll forest but also in other areas, where the understory is dense. Its shy nature and striking call results in it being recorded by sound more often than by sightings. During November and December it was found to call rarely, probably due to breeding secrecy but by January, when the young were independent, it again called vigorously. In autumn and winter it often moves into open forest.

Golden Whistler *Pachycephala pectoralis*

Common and sedentary in the sclerophyll forests but favours the drier areas and avoids rainforest. It is most vocal during the breeding season, from October to December, living mainly in the shrub layer and subcanopy.

Grey Shrike-thrush *Colluricincla harmonica*

A common, sedentary bird of the sclerophyll forests and adjacent clearings throughout the study area, occurring all year round. It feeds from ground level to the subcanopy taking items ranging from insects and spiders, gleaned from beneath loose bark, to the nestlings of small songbirds.

Satin Flycatcher *Myiagra cyanoleuca*

A common migrant which arrives about the end of October and departs in March. Its favoured habitat is the dry sclerophyll forest on the lower slopes of the mountain where it is active and noisy, feeding amongst the branches and in the canopy. It is a regular local breeder.

Grey Fantail *Rhipidura fuliginosa*

A common migrant. Though present in almost every month there is a noticeable build up in September and October. During the summer, it is one of the more common species and is a regular local breeder, occurring principally in sclerophyll forests and feeding from grass level to above the highest forest canopy. After March the population declines as birds move away. A small migrating flock was seen passing through in May, 1976.

Spotted Quail-thrush *Cinclosoma punctatum*

Uncommon and sedentary in the dry sclerophyll forest.

Superb Blue Wren *Malurus cyaneus*

An abundant, sedentary species which, except for rainforest, occurs almost anywhere there is sufficient shrub to afford protection. It is one of the first birds to appear in the clear-cut areas following burning, pairs and family groups searching for food by day and returning to the shelter of adjacent forest at dusk. It generally lives and feeds close to the ground but occasionally ascends to the lower branches of trees. It finds areas of regenerating *Eucalyptus* spp. to be an acceptable habitat, occurring in and below small saplings. Following an abnormally heavy fall of snow (plate 13) at the end of June, 1976 the population was considerably reduced, apparently by mortality resulting from the cold and inaccessability of food.

Southern Emu-wren *Stipiturus malachurus*

Rare and very localised. A pair was found breeding in a swampy, drainage area (plate 11) in the Arm River valley (Compartment 57) in November, 1975. In December flying young were also present, living amongst rushes and in tea-tree growing on the edge of the swamp. Its secretive nature makes it difficult to observe but some birds were found in the area in almost every month.

White-browed Scrubwren *Sericornis frontalis*

Common and sedentary, occurring in all habitat types where shrub is sufficiently dense to provide cover. It generally feeds close to the ground but will occasionally ascend to the lower branches of well foliaged trees for brief periods.

It is one of the first species to enter clear-cut areas following burning, pairs and individuals venturing from adjacent forest to explore amongst the remaining debris within days of the fire.

Scrubtit *Sericornis magnus*

An endemic species which is uncommon and sedentary, occurring mostly in rainforest and only rarely entering the adjacent wet sclerophyll forest. It lives and feeds mostly in the understory and shrub layer but occasionally ascends to the subcanopy. Its dependence upon rainforest indicates that its distribution and population will decline as these areas are progressively clear-cut.

Fieldwren *Sericornis fuliginosus*

Rare and sedentary, occurring in the treeless areas of native grassland in the Arm River valley where a small, localised population lives. Odd pairs were found breeding in the clear-cut areas of Compartments 2 and 57 in the summer of 1975-76, one year after the burn, by which time the growth of grass and weeds had provided sufficient cover for an acceptable short-term habitat.

Brown Thornbill *Acanthiza pusilla*

An abundant, sedentary species, occurring in all habitats except rainforest. It is most numerous in the dry sclerophyll forest and may be found feeding from ground level to the canopy. Here its distribution overlaps that of the Tasmanian Thornbill and the two species have been found together, in both wet and dry sclerophyll forest and in an area of eucalypt regeneration on the plateau of Maggs Mountain. It is most conspicuous in the spring and autumn when it forms loose flocks which move through the forest in a seemingly endless search for food. These flocks often occur in the clear-cut areas the first year after burning.

Tasmanian Thornbill *Acanthiza ewingii*

An abundant and sedentary endemic species. It occurs principally in the rainforest, wet sclerophyll forest and, to a lesser degree, in the adjacent dry sclerophyll forest and areas of regeneration where its distribution overlaps that of the Brown Thornbill. Its feeding range extends from the shrub layer to the forest canopy. It takes insects, spiders and larvae from the branches, twigs and foliage.

Yellow Wattlebird *Anthochaera paradoxa*

An endemic species which is common for much of the year. It is most noticeable in spring and autumn when it forms loose flocks and calls regularly as it moves about the canopy in sclerophyll forests. With the onset of breeding in October, the flocks disperse and the birds become secretive and less vocal. A partial exodus occurred in May, birds apparently retreating to lower altitudes and not returning until August or September.

In September, 1975 it was one of the most conspicuous birds on the Maggs Mountain plateau, feeding near to the ground amongst the foliage of the densely growing *Eucalyptus* sp. saplings in Compartments 3 and 4.

Yellow-throated Honeyeater *Lichenostomus flavicollis*

An abundant, sedentary, endemic species occurring in pairs or individuals. It lives and feeds from ground level to the sub-canopy, primarily in the sclerophyll forests where it takes insects and spiders from the trunks and branches. It is one of the early colonisers of regenerating forest, occurring in the clear-cut as a transient within a year of the burn. It was found living and breeding in Compartments 3 and 4 where the habitat consists mostly of *Eucalyptus* spp. to 4 m in height.

Strong-billed Honeyeater *Melithreptus validirostris*

An abundant, sedentary, endemic species, living in the sclerophyll forests. It is most conspicuous in November and December when flying young are obvious and noisy. Outside the breeding season it is gregarious and parties move about the forest from the canopy to the ground, probing amongst bark for insects and spiders.

Black-headed Honeyeater *Melithreptus affinis*

An abundant, sedentary, endemic species, occurring in the dry sclerophyll forest. It avoids the wet sclerophyll forest and though very numerous about the field station (450 m) it has not been found above 600 m on Maggs Mountain. It feeds mostly in the canopy but will descend to the understory and shrubs. Both adults and flying young were feeding near to the ground in the foliage of Silver Wattle *A. dealbata* in the vicinity of the field station in January, 1976.

Outside the breeding season, which extends from September to the end of the year, it is gregarious and parties move about the canopy feeding and calling almost continuously.

Crescent Honeyeater *Phylidonyris pyrrhoptera*

A common, local breeding species from September to November but less numerous from December when a post-breeding exodus occurs. Though primarily a bird of the sclerophyll forest, living in the understory and shrubs, it is sometimes found in the foliage of the old over mature *Eucalyptus* spp. standing above the canopy of rainforest. It also occurs in Compartments 3 and 4, the early regeneration area on the plateau of Maggs Mountain, where the understory is mostly *Eucalyptus* spp. standing up to 4 m high.

Eastern Spinebill *Acanthorhynchus tenuirostris*

Common in the rainforest and sclerophyll forests in spring, summer and autumn but apparently absent in June and July. It lives mostly in the shrubs and understory but occasionally ascends to the canopy.

Spotted Pardalote *Pardalotus punctatus*

A common species, seen and heard in every month but in spring and summer it is greatly outnumbered by the Striated Pardalote. It favours the dry sclerophyll forest, usually feeding in the canopy but sometimes descending to the shrubs for brief periods.

Striated Pardalote *Pardalotus striatus*

An abundant migrant, arriving in August and September and departing in April. It is highly vocal from September to January when breeding takes place.

It occurs in most habitat types and is primarily a canopy feeder but will descend to the shrubs for brief periods. It takes its food from amongst the foliage and small twigs, spiders, insects, and larvae being principal items of its diet.

Silvereye *Zosterops lateralis*

An abundant partial migrant arriving in September and departing in May. It lives primarily in the sclerophyll forests where, for much of the year, it is one of the most commonly encountered species. It is a local breeder, nesting in the shrub layer, but many non-breeding birds are present and form loose flocks which feed amongst the foliage of Silver Wattles *A. dealbata*. Small foliage-eating larvae which plagued this tree were found to form the principal proportion of its diet in early spring but from November its diet consisted mainly of adult insects.

European Goldfinch *Carduelis carduelis*

Generally common and nomadic. It is gregarious outside the breeding season when flocks of up to one hundred may occur. It is attracted to the clear-cut areas where it feeds on the seed heads of the introduced Scotch Thistle *Cirsium vulgare* but may be found in most habitats. Its population dropped noticeably following an abnormally heavy snowfall at the end of June, 1976 (plate 13).

Beautiful Firetail *Emblema bella*

Common and sedentary, occurring in the sclerophyll forests. It generally favours the less dense areas where the shrubs are sparse but has often been seen on the verges of roads in wet sclerophyll forest and rainforest. It descends to the ground to feed amongst the grass in small clearings. An abnormally heavy snow fall (plate 13) at the end of June, 1976 distressed the population, apparently by reducing the accessibility of food and its numbers were noticeably decreased in the following spring.

Common Starling *Sturnus vulgaris*

A rare visitor. About three pairs were living at the field station in November, 1975. Though appearing as if about to nest in nearby *Eucalyptus* spp. breeding did not occur and all had abandoned the area by December.

Strong populations exist in the agricultural areas about 20 km lower down the Mersey River valley.

Dusky Woodswallow *Artamus cyanopterus*

An uncommon migrant, arriving at the end of September and departing in March. It was found in a restricted area of semi-cleared dry sclerophyll forest near the field station where one or two pairs were breeding in November, 1975.

Black Currawong *Strepera fuliginosa*

This endemic Tasmanian currawong is abundant and widespread throughout the highlands. It favours sclerophyll forests but also occurs in the areas of early regeneration and on the verges of rainforest.

It disperses for breeding about November and is then usually secretive. In winter and early spring it congregates in loose flocks, which may number up to 200 birds. It is an opportunist feeder, taking a wide range of items and moves from one food source to the next as conditions dictate. Congregations often occur where logging and bulldozing operations are taking place, as the birds have learnt that food organisms are exposed as a result of the disturbance. In August it was found to be feeding principally upon earth worms, hunting and catching them in a manner similar to that of the introduced Common Blackbird *Turdus merula*. The fruit of the Mountain Berry *Cyathodes parvifolia*, also forms an important part of its diet and regurgitated remains are conspicuous, especially in the vicinity of watering places.

Forest Raven *Corvus tasmanicus*

Uncommon and sedentary, usually being seen as stealthy pairs or individuals in the sclerophyll forests.

Amphibians

Brown Tree Frog *Litoria ewingi*

Abundant with a widespread distribution. It was heard calling in most months with a peak in October and November. Metamorphs were found in December.

Smooth Froglet *Crinia laevis*

Not found on Maggs Mountain but an extensive population was found in rushes and spagnum moss on the Borradaile Plains where it was calling and laying eggs in February.

Brown Froglet *Crinia signifera*

Common but with a localised distribution. Specimens were collected in October and November on the plateau of Maggs Mountain.

Tasmanian Froglet *Crinia tasmaniensis*

Common with a widespread distribution, occurring in most pools and drains. It was found calling and egg laying on the plateau of Maggs Mountain in September, 1975. By December, the tadpoles were well developed but most perished when pools dried up. Odd individuals were heard calling in February. Specimens were collected from September to February.

Reptiles

Metallic Skink *Leiolopisma metallica*

The most common reptile, favouring open sunny situations in dry sclerophyll forest. It was active and collected in every month from September to March and was abundant in Compartment 2 where it far outnumbered the Small-scaled Skink.

Spotted Skink *Leiolopisma ocellata*

Rare. Only one was seen, and collected. It was found beneath stones in a dry drain at the power station below Lake Rowallan in March, 1975.

Small-scaled Skink *Leiolopisma pretiosa*

Commonly seen and collected from November to March, principally along logging tracks in the fourteen year old regeneration of Compartments 3 and 4 on the plateau of Maggs Mountain. In this habitat it was found to be abundant, outnumbering the Metallic Skink and usually occurring several feet above the ground, sunning itself while clinging to sides of dry logs and stumps. It often held to vertical or overhanging surfaces and would retreat to cracks in the timber when disturbed.

She-oak Skink *Tiliqua casuarinae*

Uncommon. One adult was collected near the field station in February, one small juvenile on the Maggs Mountain plateau in March and an adult by the roadside in wet sclerophyll forest in September.

Southern Bluetongue Lizard *Tiliqua nigrolutea*

Common, occurring in the sclerophyll forests and open sunny situations. It was seen and collected from November to March.

White-lipped Snake *Drysdalia coronoides*

Common. Specimens were collected on the plateau of Maggs Mountain and at the field station between November and February.

Tasmanian Tiger Snake *Notechis ater*

Common with a widespread distribution. Specimens were found in all habitat types between October and March.

Topographical map centered on the study area at Maggs Mountain. Numbers represent compartments mentioned in the text. S = the field station, T = Borraidale turn-off, R = Rowallan Dam. Co-ordinates as represented by 10,000 metre grid intervals of the Australian Map Grid.

------- roads ——— rivers ——— contour lines at 40 metre intervals

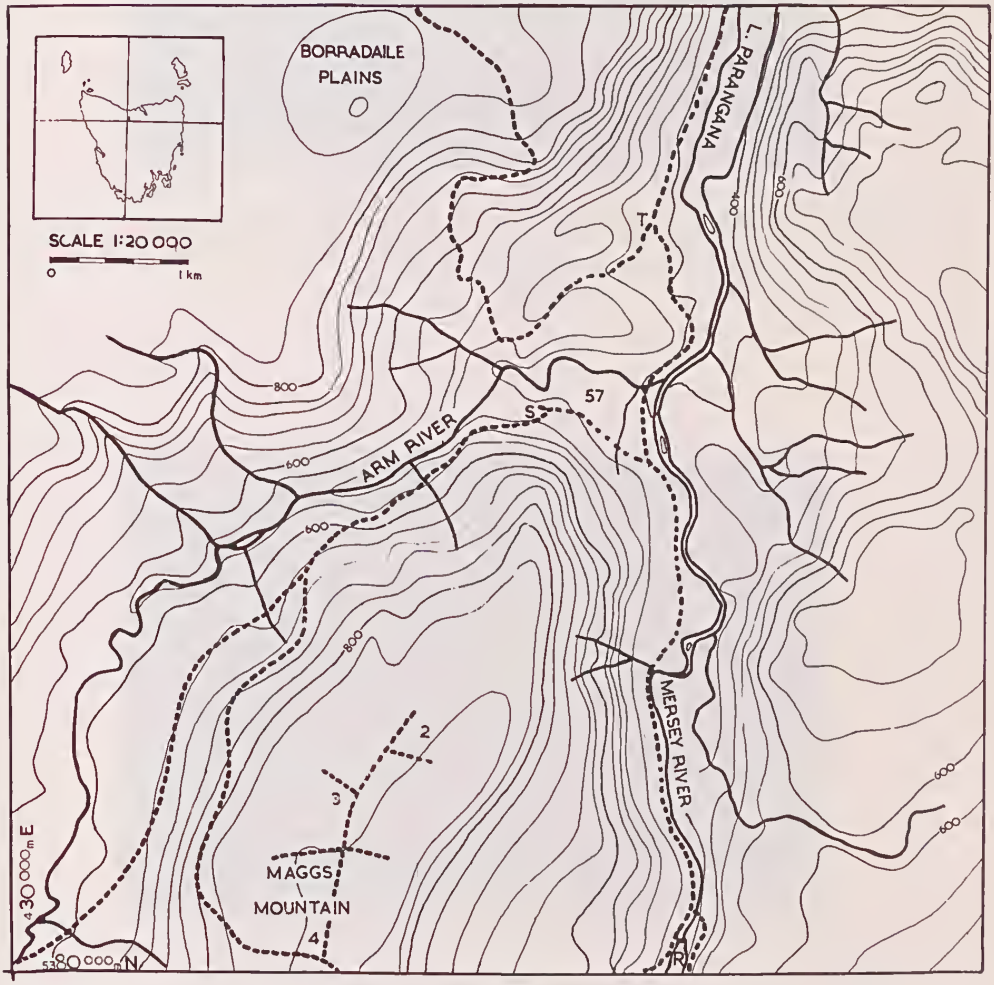

PLATE 1 North-eastern slope of Maggs Mountain from the road 100 m south of the Arm River bridge. Compartment 57 in the foreground with the valley swamp at bottom right.

PLATE 2 Myrtle *Notofagus cunninghami* rainforest with Tree-fern *Dicksonia antarctica* and accumulated wet forest litter, 200 m north-east of the Borradaile turn-off.

PLATE 3 Wet sclerophyll forest 200 m up-stream from the Arm River bridge on the north side of the river. The area was once logged and now supports dense regrowth.

PLATE 4 Dry sclerophyll forest on the northern slope of Maggs Mountain above the Arm River road and about 5 km west of the field station. The millable trees were cut out some years ago.

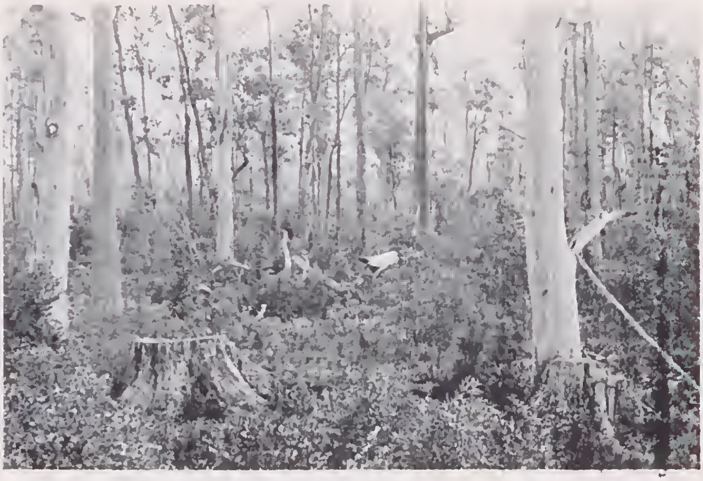

PLATE 5 Compartment 3 on the plateau of Maggs Mountain looking north from the access road in August, 1976. The area was logged for sawlogs about 1961 but not clear-cut. It was burnt in March, 1962 and reseeded by natural fall from seed trees left standing.

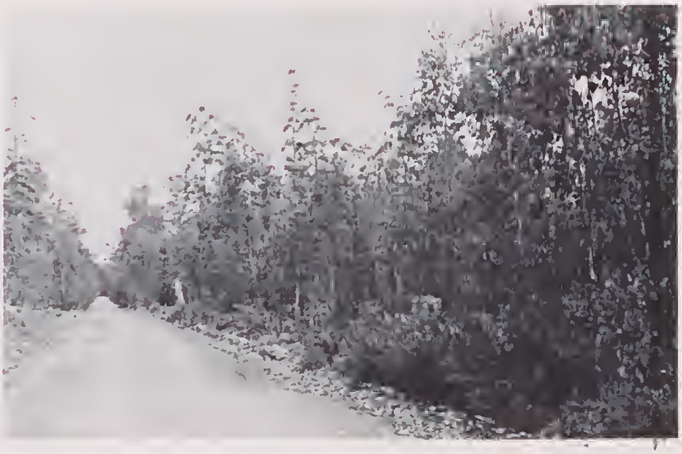

PLATE 6 The access road on the southern edge of Compartment 4 looking west on the plateau of Maggs Mountain in August, 1976. The area was logged about 1961 and burnt in March, 1962. Reseeding was by natural fall from seed trees left standing.

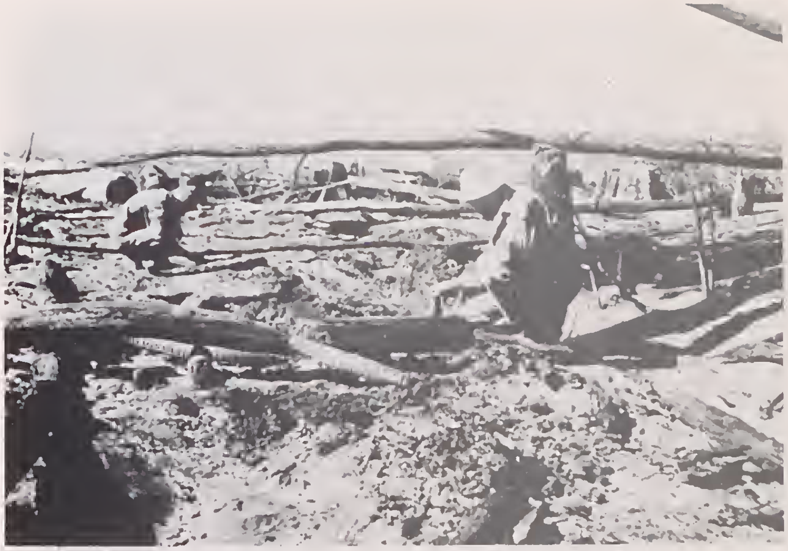

PLATE 7 Compartment 2 on the plateau of Maggs Mountain, the day after the controlled burn of 17 February, 1975.

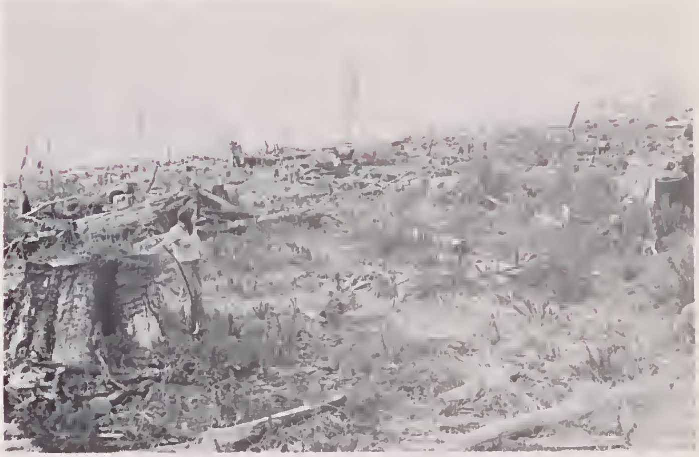

PLATE 8 Compartment 2 in August, 1976 showing regrowth of grass and fireweed eighteen months after the controlled burn (see plate 7). Eucalypt seedlings are up to 20 cm high.

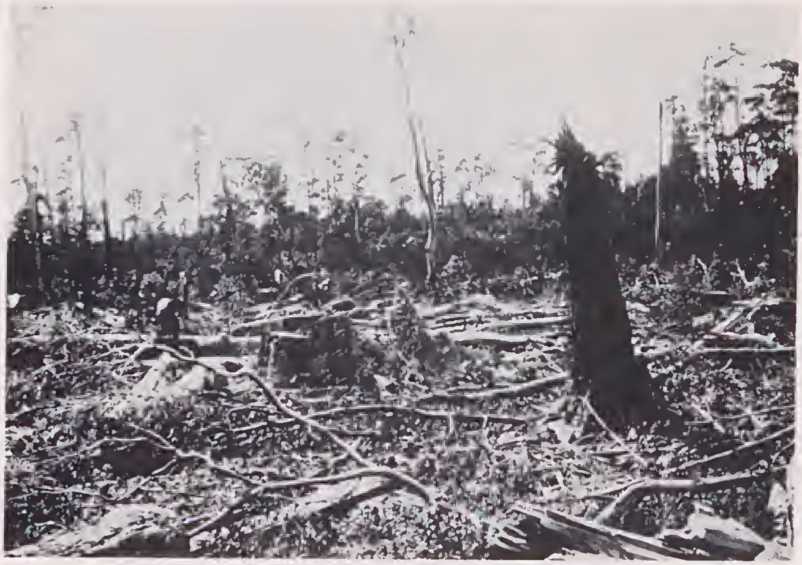

PLATE 9 The western section of Compartment 2 on the plateau of Maggs Mountain, a few weeks after being logged in the winter of 1974 and left without being bulldozed or burnt, as a control area for future comparison.

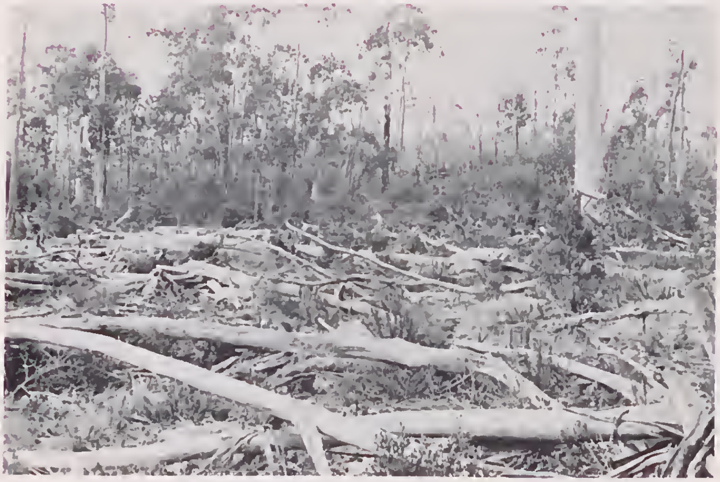

PLATE 10 The control area in Compartment 2 two years after it was clear-cut (see plate 9).

PLATE 11 The northern section of Compartment 57 in the Arm River valley. The swamp in the foreground is the habitat of the Emu-wren, Spotless Crake and Tasmanian Native Hen.

PLATE 12 Grassland in the Arm River valley 5 km west of the field station. The area, once mostly forest, was cleared by hand many years ago and is now used for cattle grazing during autumn.

PLATE 13 Heavy snow near the field station at Maggs Mountain in the fourth week in June, 1976.

PLATE 14 Looking west over Maggs Mountain (middle distance) which appears as a ridge separating the Arm River (beyond) and the Mersey River. The Arm River joins the Mersey River below the northern end of Maggs Mountain. The small clearing in the foreground is Dublin Plain.

Fish

Very few observations were made. Blackfish *Gadopsis marmoratus* and Short-finned Eel *Anguila australis*, occur in the Mersey River. Brown Trout *Salmo trutta* have been introduced and are now abundant.

THE EFFECTS OF PULP-WOOD OPERATIONS

Clear-cut, slash and burn

This method of logging is used where both saw and chip logs are extracted from a defined area (or compartment) in a single operation. Most of the timber cut in Tasmania is now taken by this method in forests which have been previously selectively logged for sawlogs. Compartment size may vary from a few to several hundred hectares and is dependant upon physical features and environmental considerations. Following tree-felling and the removal of all the commercially acceptable logs from a compartment, the area is slashed in preparation for burning. For this, bulldozers are used to break down the shrubs and smaller trees and many of the remaining large cull trees, unacceptable to the industry and which may dominate and impede subsequent regeneration, are felled by chainsaw. Those which are not unduly detrimental to regeneration are left standing and provide some shelter and nesting sites for mammals and birds. The residue is then left for some months to die and dry out in preparation for firing. When compartments are not bordered by roads, fire breaks are cleared by bulldozing. At lower altitudes burning is generally carried out under mild conditions and days of high fire danger are avoided. At high altitudes it is necessary to burn in mid-summer because conditions are seldom satisfactory at other times. Burning seldom removes the material above 20 cm in diameter but it may improve access within the compartments and reduce the risk of future wild fires. It also provides a better seed bed for subsequent sowing or planting. Ignition is achieved by a crew of men moving across the compartment, lighting the dead vegetation at regular intervals. The perimeter is patrolled as a check against the possibility of fire jumping a break and igniting adjoining areas. An area of one hundred hectares may be fired in an hour but large timber may continue to burn or smoulder for some days.

Seeding, from an aeroplane or by hand, is undertaken in the following winter, with eucalypts of the same species and in the same ratio as previously grew in the area. Germination occurs in spring and seedlings may grow to 20 cm by the end of the first summer.

The immediate effects on the fauna

During the spring and summer of 1974-75, the general effects of clear-cut, slash and burn on the fauna of an area were noted. Compartment 2 on the plateau of Maggs Mountain was selected as being typical and convenient for continuing study. Observations made here and in Compartment 57 over this period form the basis for the following comments.

The felling of trees and removal of saw and chip logs has the immediate effect of completely disrupting all fauna in the area. The noise of machinery and falling of trees frightens most mammals and birds. Wallabies, possums and most birds then evacuate to adjoining forest. Alternatively, Black Currawongs are attracted to food exposed by logging operations and may congregate there while the disturbance continues.

Following the completion of logging operations, and in the absence of slashing, bulldozing or any further disturbance, Brush Wallabies and Tasmanian Pademelons start to move back, hiding beneath the surviving shrubs and accumulated litter. Arboreal marsupials and canopy feeding birds are limited by the amount of tall timber left standing and this is rarely sufficient to support breeding populations. A few Superb Blue Wrens, White-browed Scrubwrens and Brown Thornbills re-establish and breed in the first year.

Without further disturbances such an area may, within a few years, regenerate sufficiently to provide habitat favourable to many sclerophyll forest species. The semi-open conditions allow sunlight to penetrate and shrub dwelling birds to flourish. The dense regeneration also provides good habitat for some ground dwelling mammals. As saplings grow, their foliage provides an increasing habitat range for canopy dwelling birds and arboreal marsupials. Such canopy gain will, in time, prove detrimental to some shrub dwelling species, especially birds, as those not adapted to living below a closed canopy then find survival difficult.

When clear-cutting is undertaken, most of the remaining cull trees are felled and the shrubs and understory are bulldozed down in order to kill off and dry out the vegetation, thus producing higher inflammability and a more complete burn. This secondary disruption further reduces shelter when foliage dries and falls. The area may remain a suitable habitat for Brush Wallabies, but it is abandoned by most other mammals and birds. Except for the wallabies, a few White-browed Scrubwrens, thornbill species and occasional transient mammals and birds it appears derelict and deserted.

Observations during burning showed Brush Wallabies to be a common escapee and they move out of the compartment well ahead of the fire. Some White-browed Scrubwrens were also seen to be dispersed by smoke, crossing to adjoining areas well ahead of the flames. Very little other fauna activity was noticeable.

A search undertaken the day after burning failed to reveal any carcasses. Some wallaby tracks were found in the ash, providing evidence of exploratory animals returning in the first night after burning when the whole area was still well lit by burning logs and trees. Black Currawongs and Forest Ravens were over the area, possibly attracted by lizards, insects and spiders moving about the unburned patches. The lizards and invertebrates apparently had survived underground or inside wet, unburned logs.

Five weeks later an inspection showed the area to be almost totally deserted except for odd transitory flying insects, some spiders and some Metallic Skinks. Light peripheral grazing indicated some nocturnal activity by mammals from adjoining forest.

Emigrants from an area so affected may survive for a while by being absorbed in the adjacent populations but the creation of any excess above natural levels inevitably creates interspecific competition for food, shelter and breeding sites. Ultimately, populations are reduced to levels compatible with the capacity of the habitat.

Postburn: the first eighteen months

Regular monthly visits, each of about three hours duration, were made to Compartment 2. These revealed little change in the vegetation until after the following winter. Some grazing was evident and fresh faeces and footprints of Brush Wallabies, Common Wombats, Brush Possums and Rabbits were found.

In September, the old established grasses began to produce spring growth and by December there were many vigorous stands running to seed. Ferns *Polystichum proliferum* were regenerating and Fireweed *Senecio velleiodes* and *S. linearifolius* were growing prolifically. Fresh faeces of grazing marsupials and rabbits were very plentiful and an Echidna was found searching for food. Tadpoles of the Brown Tree-frog and of a froglet *Crinia* sp. were numerous in water-filled ruts and depressions.

In January *Eucalyptus delegatensis* seedlings were up to about 10 cm high, lacking any evidence of browsing. A few young wattles, *Acacia* sp., were also present. Insects such as flies, butterflies, moths, grasshoppers and field crickets were plentiful. Metallic Skinks were generally distributed throughout the area.

In February the grass on undisturbed areas was up to 30 cm tall and in seed. Marsupial and rabbit faeces and the associated footprints and scratching in the earth were very common. Considerable grazing pressure was evident on grass and shrubs. Fireweed and Scotch Thistles were plentiful and commencing to flower. Ten species of insect- and seed-eating birds were present as follows: 2 Green Rosellas, 1 Fantail Cuckoo, 1 Shining Bronze-cuckoo, 18 Flame Robins, 4 Dusky Robins, 2 Grey Shrike-thrushes, 2 White-browed Scrubwrens, 4 Superb Blue Wrens, 15 Striated Pardalotes, 5 Yellow-throated Honeyeaters, 15 Blue-winged Parrots and 3 Fieldwrens.

A series of plants were collected in February, 1976 from within Compartment 2 and are now housed in the Queen Victoria Museum Herbarium. Table 4 gives a list of these together with an indication of their abundance.

In March, the general appearance of the area and the fauna it supported appeared similar to that of February.

In April, the young eucalpyts had reached to about 20 cm in height and mammal browsing and leaf pruning of these was general over much of the area. The fine foliage was being severed from the stems and dropped on the ground close round the plant. Little appeared to have been actually eaten and affected plants had a soiled and rather trampled appearance. The animals responsible for this were not determined. Wallaby species, Brush Possum, Common Wombat and Rabbit faeces were abundant. Fireweed was being pruned in a similar manner and grass was well grazed in patches. Seven species of birds were found comprising 14 Flame Robins, 2 Dusky Robins, 1 Grey Shrike-thrush, 2 White-browed Scrubwrens, 8 Superb Blue Wrens, 1 Fieldwren and about 100 Goldfinches which were feeding on the seed heads of Scotch Thistles.

In May, mammal damage to young eucalypts and Fireweed was continuing and grass was well grazed in patches. The faeces of marsupials and Rabbits were plentiful. Goldfinches were still present and feeding on Scotch Thistle seeds. A flock of about 15 Green Rosellas was found in the compartment and were feeding on the ripening seed heads of Fireweed *S. linearifolius*. Two Grey Shrike-thrushes, 8 Brown Thornbills, 4 White-browed Scrubwrens, 20 Superb Blue Wrens, 3 Yellow-throated Honeyeaters, 1 Beautiful Firetail and 2 Fieldwrens were also found. About 5 cm of snow had fallen in early May and lay for about two days but very little autumn rain had fallen and the area was unusually dry. A few small, undetermined tadpoles were found in odd water-filled ruts.

In June, conditions appeared similar to those of May. Twenty Green Rosellas, a pair of Scarlet Robins, 2 Dusky Robins, 2 Firetails, 4 Forest Ravens, 2 Black Currawongs, 1 Fieldwren and a flock of about 20 Goldfinches were found in the compartment.

In July, a fall of snow (see plate 13) prevented a visit to Compartment 2. Up to 15 cm covered exposed areas round the field station for a week, and the fall on the plateau would have been considerably heavier.

COMMENTS

The complete lack of evidence in the area of such mammals as the Forester Kangaroo *Macropus giganteus*, Eastern Bettong *Bettongia gaimardii*, Little Pigmy Possum *Cercaretus lepidus*, Barred Bandicoot *Perameles gunnii*, Quoll *Dasyurus viverrinus*, Swamp Antechinus *Antechinus minimus* and Broad-toothed Rat *Mastacomys fuscus* is not surprising as the wet highland forest environment is not favourable (see Green, 1973). Table 5 lists the species occurring at Maggs Mountain and gives four degrees of abundance in five different habitats.

The apparent absence of some species of birds is not so easily explained. It does seem probable that some, such as quail and snipe might eventually appear in clear-cut areas as these extend. It is also most likely that future observations will record additional species such as Little Black Cormorant *Phalacrocorax sulcirostris*, Little Pied Cormorant *P. melanoleucus*, Chestnut Teal *Anas castanea*, Musk-duck *Biziura lobata*, Swamp-Harrier *Circus aeruginosus*, Grey Goshawk *Accipiter novaehollandiae*, Collared Sparrowhawk *A. cirrocephalus*, Spotted Owl *Ninox novaeseelandia*, Masked Owl *Tyto novaehollandiae*, Swift Parrot *Lathamus discolor*, and Spine-tailed Swift *Hirundapus caudactus*. However, such occurrences probably will be rare and mainly of a nomadic or transitory nature.

The absence of records of Pallid Cuckoo *Cuculis pallidus*, Yellow-winged Honeyeater *Phylidonyris novaehollandiae*, and Little Wattlebird *Anthochaera* *chrysoptera* during the two years of observations is surprising as all occur commonly in a fairly wide range of lowland habitats. Most of the remaining Tasmanian bird species not recorded in the area are those which may be expected to avoid the wet highland forests.

The dry sclerophyll forest supports a greater number of bird species than other habitat types. Table 6 shows that of the 56 bird species recorded in the study area to date, 45 (80%) occur in the dry sclerophyll forest. Thirty-three (59%) occur in the wet sclerophyll forest and 16 (29%) occur in rainforest.

The 26 species (46%) recorded from clear-cut areas within eighteen months of burning is surprisingly high in comparison to other habitats. This is partly explained by the inclusion of a number of transitory or exploratory species which are merely passing through but it also reflects the arrival of some grassland species which cannot live in the forests.

Only three of the ten species of Tasmanian amphibia have been found at Maggs Mountain though a fourth has been found in considerable numbers on the nearby Borradaile Plains. Two of the three land snakes occur commonly and five of the 12 species of lizards have been found. Table 8 gives the relative abundance of these in five different habitats.

IMPRESSIONS

This study has been too brief to draw conclusions about the effects of clear-cutting upon the fauna or to make recommendations for future fauna management in such areas. It is natural, however, that two years spent at Maggs Mountain have left me with some impressions of the effects of present forestry activity upon some of the wildlife and of clear-cut operations in particular. In the present absence of data upon which sound management plans can be based, it is fair and, hopefully, useful to present some comments.

Vertebrate animals decrease numerically, both in species and individuals, with increasing altitude. This is evident on the northern slope of Maggs Mountain and it does not appear to be directly attributable to the vegetation. No species is exclusively altitudinal, all those occurring on the plateau being represented in greater abundance at lower altitudes. The high altitude forests (about 700 m) may therefore be seen as providing an extension of distribution for the altitudinally tolerant species, especially with respect to the avifauna, and are not critical to the survival of any vertebrate species. Alternatively, the presence of vertebrate animals in high altitude forests may, by their predation upon the invertebrate fauna and other activities, be important in the development of good quality trees.

The forests of lower altitudes (below 700 m) provide the principal habitats for many vertebrate species and the methods of management in these areas must have an important bearing on the eventual populations of many species. Likewise, the maintenance of a healthy, well-balanced fauna must be commensurate to good forest management and satisfactory forest regeneration.

The problems of fauna conservation, in relation to reafforestation, should not be considered for simply deriving systems to save animals for their own sake. Vertebrates form the upper links in the natural food chain and are of vital importance to the maintenance of a balanced ecology and a healthy, vigorous and productive forest. Both are of equal importance to foresters and zoologists and the work of each must be closely related.

The past era of selective felling for quality sawlogs has degraded forests and is detrimental to maximum commercial timber yields but its effect upon the fauna has not been drastic. Alternatively, the present method of clear-cut, slash and burn, though advantageous to vigorous eucalypt regeneration at lower altitudes, is devastating in its immediate effect upon forest fauna. A few grassland birds invade and utilise such a habitat for short periods, some even to breed, and some forest species occur as transients until the vegetation increases sufficiently to provide suitable residence. Some grazing marsupials are favoured by a short term improvement in food and invade from surrounding forests to feed during the night. Such occurrences are the exception for by far the greatest proportion of forest fauna species cannot successfully re-establish themselves for years. For many species, we do not yet know the stage of regeneration a clear-cut forest must attain before it becomes an acceptable and viable habitat. Nor do we know the effects of such specific absenteeism upon successful forest regeneration, particularly when the areas of forest under regeneration are expanded significantly.

It therefore seems reasonable to assume that forest harvesting should be conducted on a cutting level somewhere between the earlier selective sawlogging operations and the complete clear-cut, slash and burn method.

Old, overmature or dead trees, especially those with decaying trunks or containing cavities are essential if those species of birds which rest and breed in such places are to be retained. Likewise, they are used by arboreal marsupials and bats. Such trees are therefore vital in a maturing forest and provision should be made to retain as many as practically possible. Allowance should also be made for replacements by retaining some submature trees of various ages, scattered throughout the area as shelter-wood for fauna as well as for the regenerating shrub layer. The retention of as many tall, foliaged trees as possible in a compartment also encourages the retention of foliage dwelling fauna and if sufficient, could provide for a viable, though greatly reduced, population.

Just as the removal of trees removes the canopy fauna, so the slashing and burning of the shrub layer removes the shrub-dwelling fauna. In areas where slash and burn has not taken place following clear-cutting, it is evident that some shrub-dwelling species remain and in some instances, successfully breed. Thus, if slash and burn can be avoided and an acceptable level of forest regeneration still achieved, it appears to be an advantageous step towards fauna retention.

The compartment size for providing the earliest and best recolonisation, whatever it may be, obviously varies according to physical conditions and the species concerned. Some animals are highly intolerant to change while others adapt and their populations increase.

Under favourable conditions most species provide an excess of offspring for replacement stock and these can only survive when sufficient space of a suitable quality is available. As an area regenerates it should provide this requirement, gradually and at differing times for different species. Recolonisation is a gradual process, developing in parallel with the growth of vegetation. This gradual development reaches out from the forested periphery progressively enveloping and colonising as the quality of the habitat required by the respective species reaches acceptability. The ability of species to undertake this process suggests that compartment size is relatively unimportant when a source of supply stock is available.

The return and re-establishment of vertebrates to regenerating forest is dependent upon food, shelter and conditions for breeding. As a food source is re-established, relevant species will move in to take advantage whether grazers, browsers, insectivores or carnivores. The beginning of the food chain must be established before the higher links can be expected to appear.

The size of compartments should be considered firstly in relation to factors which may affect the re-establishment of plants and invertebrate fauna. As re-establishment is not a quick, short-term operation but rather a gradual spread and development over many years as respective stages of growth are reached, there is little advantage in keeping compartments very small (e.g.) less than 500 ha. The distance from established forest already supporting a fauna source, the amount of shelter wood and aged trees left standing and, of prime importance, time for recolonisation before the adjoining forest is cut are factors with a far greater bearing upon successful re-establishment. Provided these three factors are considered, together with conditions dictated by the topography, the reafforestation and associated fauna establishment can be equally successful in a large compartment, say 10 000 ha, as in one of 100 ha. The animals will propogate and spread at a rate equal to that of the development of their requirements.

In this sense, it is equally true to suggest that a strip compartment, say 2 km wide and of indefinite length, can be just as successfully redeveloped as one with a radius of 1 km.

Large compartments may be desirable as they provide greater scope for the highly sedentary species, enabling them to maintain viable populations without the need for inter-compartment movement. Large compartments may also be less susceptible to browse damage in the first few years of regeneration because the areas from which the herbivors invade at night are further from the compartment centre.

ADDENDUM

Examination of Animals for Parasites and Disease Processes

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During 1975 and early 1976 tissues from a wide range of birds, a limited number of mammals and one species of snake were examined. In some instances, whole carcasses were available but most studies were undertaken on samples of formalin-fixed muscle and gastro-intestinal tract.

Findings will be discussed under the headings of sporozoan parasites, helminth parasites and miscellaneous conditions.

Sporozoan parasites

Sporozoa are parasitic protozoans which include such potentially pathogenic organisms as *Toxoplasma gondii, Sarcocystis* spp. and the various intestinal coccidia. No appropriate methods were used for the detection of *Toxoplasma*, but some tissues were examined for *Sarcocystis* and intestinal coccidia.

(a) *Sarcocystis* in native rats

Microscopic sarcocysts with thick walls were detected in the skeletal muscles, but not heart muscle of the Velvet-furred Rat *Rattus lutreolus* and the Long-tailed Rat *Pseudomys higginsi*. The technique used was to examine about 20 sections of muscle from each animal and the prevalence rates obtained by this method was approximately 50%.

As *Sarcocystis* spp. have a cycle between prey and predator with the sarcocysts in the prey, a number of potential predators were fed *Sarcocystis*-infected *R. lutreolus*. No evidence of successful transmission was obtained when these animals were fed to Quolls *Dasyurus viverrinus*, domestic cats *Felis catus* or a Masked Owl *Tyto novaehollandiae*. After these feeding trials were completed one of two Tiger Snakes *Notechis ater* from Maggs Mountain was found to have an intestinal infection with a sporozoan with typical *Sarcocystis* morphology. Sporocysts (7 x 10 μm with 4 sporozoites) from this animal were dosed into two laboratory rats *R. norvegicus* one of which died 17 days later and the other was killed 4 months later. The animal which died had myocarditis with the presence of *Sarcocystis*-type schizonts and the other rat had sarcocysts in its muscle. One of two rats kept as controls in the same cage also had tissue sarcocysts, but it is believed that this infection was derived from sporocysts which passed through the gastro-intestinal tracts of the dosed animals. These findings are similar to those of Rzepczyk (1974) and Zaman and Colley (1975) who have demonstrated a python/rat cycle for *Sarcocystis* in northern Australia and Singapore.

The pathogenicity of this species of *Sarcocystis* is of interest as it may be responsible for some mortality in colonies of native rats.

(b) *Sarcocystis* in native birds

Sarcocysts were detected in Strong-billed Honeyeaters *Melithreptus validirostris*, a Grey Shrike-thrush *Colluricincla harmonica*, a Beautiful Firetail *Emblema bella*, a White-browed Scrubwren *Sericornis frontalis*, a Tree Martin *Cecropis nigricans*, Black Currawongs *Strepera fuliginosa* and a Scarlet Robin *Petroica multicolor*.

It is presumed at this stage that these are all the same species of *Sarcocystis*, and are the result of the birds ingesting infective sporocysts with food or water. To date no potential predators of these birds, which have been collected at Maggs Mountain, have been found to have *Sarcocystis*-type intestinal infections.

(c) Intestinal coccidiosis

Intestinal coccidia, believed not to be part of a *Sarcocystis* cycle, were seen in sections of intestine from a number of birds and one snake. The infections did not appear to be of significant pathogenicity.

The species were:

1. Birds

White-browed Scrubwren *Sericornis frontalis*
Yellow-throated Honeyeater *Lichenostomus flavicollis*
Grey Shrike-thrush *Colluricincla harmonica*
Black-headed Honeyeater *Melithreptus affinis*
Flame Robin *Petroica phoenicea*
Silvereye *Zosterops lateralis*
Superb Blue Wren *Malurus cyaneus*

2. Reptiles

Tiger Snake *Notechis ater*

Helminth parasites

(a) Trematodes

1. Parasites with the morphology of trematodes were detected in the pancreatic ducts of a *N. ater*.

2. An *Athesmia* sp. was present in the bile ducts of several *R. lutreolus*.

(b) Cestodes

A *Himenolepis* sp. was recovered from the intestines of *R. lutreolus* and strobilocerci of *Taenia taeniaeformis* were present in the livers of some of these animals.

(c) Nematodes

1. Tiger Snake *N. ater*
Ophidascaris pyrrhus from stomach

2. Lesser Long-eared Bat *Nyctophilus geoffroyi*
Filarioids from heart

3. Velvet-furred Rat *R. lutreolus*
Protospirura muris from stomach
Heligosomes from small intestines
Ganguleterakis spumosa from large intestine

Miscellaneous conditions

(a) Focal hepatitis was a common finding, characterised by the presence of foci of mononuclear cells scattered throughout the liver parenchyma. Species affected were Superb Blue Wren *M. cyaneus*, White-browed Scrubwren *S. frontalis*, Yellow-throated Honeyeater *L. flavicollis*, Black Headed Honeyeater *M. affinis*, Striated Pardalote *Pardalotus striatus*, Grey Shrike-thrush *C. harmonica*, Golden Whistler *Pachycephala pectoralis*, Satin Flycatcher *Myiagra cyanoleuca*, Dusky Robin *Melanodryas vittata*, Velvet-furred Rat *R. lutreolus*, Long-tailed Rat *P. higginsi*. There was no obvious cause of these lesions.

(b) Focal interstitial nephritis was found in one *R. lutreolus*.

(c) A high proportion of *R. lutreolus* has inflammatory lesions of the lungs, especially peribronchial cuffing by mononuclear cells.

TABLE 1 Botanical species collected in an area of wet sclerophyll-rainforest at the Borradaile turn-off near Maggs Mountain in September 1974.

GYMNOSPERMAE	PODOCARPACEAE	*Phyllocladus aspleniifolius*
ANGIOSPERMAE		
DICOTYLEDONS	RANUNCULACEAE	*Clematis aristata*
	VIOLACEAE	*Viola hederacea*
	PITTOSPORACEAE	*Pittosporum bicolor*
	ELEOCARPACEAE	*Aristotelia penduncularis* (Heart Berry)
	RUTACEAE	*Zieria arborescens* (Stinkwood)
	RHAMNACEAE	*Pomaderris apetala* (Dogwood)
	LEGUMINOSAE	*Acacia dealbata* (Silver Wattle)
		Oxylobium ellipticum (Golden Rosemary)
	ROSACEAE	*Rubus gunnianus*
	MYRTACEAE	*Eucalyptus obliqua* (Stringybark)
		Eucalyptus delegatensis (Gum-top Stringybark)
	RUBIACEAE	*Coprosma nitida*
	COMPOSITAE	*Olearia viscosa*
		Senecio linearifolius
		Senecio sp.
		Helichrysum rosmarinifolius
	EPACRIDACEAE	*Leucopogon ericoides*
		Monotoca glauca
		Cyathodes juniperina
		Cyathodes parvifolia
	OLEACEAE	*Notelaea ligustrina* (Native Olive)
	MONIMIACEAE	*Atherosperma moschatum* (Sassafras)
	PROTEACEAE	*Lomatia tinctoria* (Guitar Plant)
	THYMELIACEAE	*Pimelea drupaceae*
	FAGACEAE	*Nothofagus cunninghamii* (Myrtle)
MONOCOTYLEDONS	ORCHIDACEAE	*Chiloglottis gunnii*
		Corybas dilatatus
	LILIACEAE	*Drymophila cyanocarpa* (Blue Berry)
	GRAMINEAE	*Poa* sp.
PTERIDOPHYTA	ASPIDIACEAE	*Polystichum* sp.
	BLECHNACEAE	*Blechnum* sp.
	DICKSONIACEAE	*Dicksonia antarctica* (Tree Fern)
	GRAMMITIDACEAE	*Grammitis* sp.
BRYOPHYTA	MUSCI	7 spp. unidentified
	HEPATICAE	2 spp. unidentified
MYCOPHYTA		4 spp. unidentified

TABLE 2 Botanical species collected in an area of dry sclerophyll forest at Maggs Mountain in September, October and November, 1974.

ANGIOSPERMAE		
DICOTYLEDONS	RANUNCULACEAE	*Ranunculus pascuinus*
		Ranunculus spp. (2)
	VIOLACEAE	*Viola* sp.
	ELAEOCARPACEAE	*Aristotelia peduncularis*
	GERANIACEAE	*Geranium* sp.
	STACKHOUSIACEAE	*Stackhousia* sp.
	LEGUMINOSAE	*Acacia melanoxylon* (Blackwood)
		Acacia dealbata
		Pultenea juniperina
	BOSSIAEA	*Bossa cordigera*
		Daviesia latifolia
		Goodia pubescens
	ROSACEAE	*Acaena* sp.
		Rubus sp.
	DROSERACEAE	*Drosera auriculata*
	MYRTACEAE	*Eucalyptus viminalis*
		Eucalyptus delegatensis
	RUBIACEAE	*Coprosma nitida*
		Coprosma hirtella
	COMPOSITAE	*Olearia lirata*
		Helichrysum dendroideum
		Helichrysum sp.
		Senecio linearifolius
		Senecio sp.
	ERICACEAE	*Gaultheria hispida*
	EPACRIDACEAE	*Leucopogon hookeri*
		Leucopogon ericoides
		Cyathodes juniperina
		Cyathodes parvifolia
	OLEACEAE	*Notelaea ligustrina*
	CONVOLVULACEAE	*Dichondra* sp.
	LABIATEAE	*Ajuga* sp.
	PROTEACEAE	*Lomatia tinctoria*
		Hakea sp.
	THYMELIACEAE	*Pimelea* sp.
	SANTALACEAE	*Exocarpus strictus*
MONOCOTYLEDONS	ORCHIDACEAE	*Pterostylis pedunculata*
		Pterostylis nutans
		Pterostylis longifolia
		Chiloglottis gunni
	LILIACEAE	*Drymophila cyanocarpa*
		Lomandra longifolia
	IRIDACEAE	*Diplarrhena moraea*
	GRAMINEAE	*Poa* sp.
	JUNCACEAE	*Luzula* sp.
		Juncus sp.
PTERIDOPHTYA	BLECHNACEAE	*Blechnum* sp.
	ASPIDIACEAE	*Asplenium flabellifolium*
	POLYPODIACEAE	*Microsorium diversifolium*
	DENNESTAEDIACEAE	*Pteridium esculentum* (Bracken)
		1 sp. unidentified
BRYOPHYTA	MUSCI	4 spp. unidentified

TABLE 3 Botanical species collected in an area of wet sclerophyll regeneration (Compartments 3 and 4) on the plateau of Maggs Mountain in September, October and November 1974. The area was burnt in 1962 following logging.

GYMNOSPERMAE	PODOCARPACEAE	*Phyllocladus asplaniifolius* (Celery-topped Pine)
ANGIOSPERMAE		
DICOTYLEDONS	RANUNCULACEAE	*Ranunculus pascuinus*
		Ranunculus sp.
	WINTERACEAE	*Drimys lanceolata* (Mountain Pepper)
	VIOLACEAE	*Viola hederacea* (Violet)
	PITTOSPORACEAE	*Pittosporum bicolor* (Cheese or Tallow-wood)
	LEGUMINOSAE	*Acacia dealbata* (Silver Wattle)
		Pultenea juniperina (Prickly Beauty)
	ROSACEAE	*Rubus fruticosus* (Blackberry sp.)
		Acaena sp. (Buzzy)
	MYRTACEAE	*Eucalyptus delegatensis* (Gum-topped Stringybark)
		Eucalyptus viminalis (White or Manna Gum)
	RUBIACEAE	*Coprosma nitida*
	COMPOSITAE	*Senecio linearifolius* (Fire-weed)
	EPACRIDACEAE	*Cyathodes parvifolia* (Pink Mountain Berry)
	OLEACEAE	*Notelaea ligustrina* (Native Olive)
	PROTEACEA	*Hakea* sp.
		Telopea truncata (Warratah)
		Lomatia tinctoria (Guitar Plant)
	THYMELIACEAE	*Pimelea drupacea*
	FAGACEAE	*Nothofagus cunninghamii* (Myrtle)
MONOCOTYLEDONS	ORCHIDACEAE	*Chiloglottis gunnii*
	LILIACEAE	*Drymophila cyanocarpa*
	GRAMINEAE	*Poa* sp.
	JUNCACEAE	*Luzula oldfieldii*
		Juncus sp.
PTERIDOPHYTA	DENNSTAEDTIACEAE	*Pteridium esculentum* (Bracken)
	ASPIDIACEAE	*Polystichum* sp.
	BLECHNACEAE	*Blechnum penna-marina*
		Blechnum fluviatile
	LYCOPODIACEAE	*Lycopodium fastigiatum*
BRYOPHYTA	MUSCI	4 spp. unidentified

TABLE 4 A list of the botanical specimens collected in February, 1976 from Compartment 2, an area of clear-cut on the plateau of Maggs Mountain which was burnt in February, 1975. Relative abundance at the time of collection is indicated: A = abundant, F = frequent, O = occasional.

PTERIDOPHYTA	LYCOPODIACEAE	*Lycopodium fastigiatum*	O
	FILICINAE	*Pteridium esculentum*	A
		Polystichum proliferum	F
MONOCOTYLEDONS	LILIACEAE	*Drymophila cyanocarpa*	O
	JUNLACEAE	*Luzula campestris*	O
		Juncus sp.	F
	ORCHIDACEAE	*Chiloglottis* sp.	O
	GRAMINEAE	*Agrostis parviflora*	O
		Agropyron pectinatum	A
		Echinopogon ovatus	F
		Poa sp.	O
		5 unidentified grass spp.	FFOFO
DICOTYLEDONS	RANUNCULACEAE	*Ranunculus scapigerus*	A
	CRUCIFERAE	*Cardamine tenuifolia*	O
		1 unidentified sp.	O
	VIOLACEAE	*Viola sieberiana*	A
	CARYOPHYLLACEAE	*Scleranthus biflorus*	O
	HYPERICACEAE	*Hypericum japonicum*	O
	GERANIACEAE	*Geranium (molle?)*	A
		Geranium potentillioides	O
	OXALIDACEAE	*Oxalis corniculata*	A
	LEGUMINOSAE	*Pultenea juniperina*	O
	ROSACEAE	*Acaena (novaehollandiae?)*	O
	ONAGRACEAE	*Epilobium* sp.	F
	UMBELLIFERAE	*Hydrocotyle sibthorpiodes*	O
		Asperula gunnii	O
		Galium gaudichaudii	O
	COMPOSITAE	*Lagenophora stipitata*	O
		Olearia ramulosa	O
		Olearia (stellulata?)	O
		Helichrysum scorpioides	A
		Gnaphalium collinum	A
		perhaps a second sp.	O
		Senecio linearifolius	F
		Senecio velliodes	A
		Senecio jacobea	A
		Taraxacum officinale	O
		Crepis capillaris	O
		Hypochaeris radicata	A
		Cotula alpina	O
	CAMPANULACEAE	*Wahlenbergia consimilis*	F
	EPACRIDACEAE	*Cyathodes parvifolia*	O
	GENTIANACEAE	*Gentianella diemensis*	O
	SCROPHULARIACEAE	*Veronica* sp.	O
	POLYGONACEAE	*Rumex acetosella*	O
	PROTEACEAE	*Lomatia tinctoria*	F
	THYMELIACEAE	*Pimelea* sp.	O
	EUPHORBIACEAE	*Poranthera microphylla*	O
	URTICACEAE	*Urtica urens*	O
		2 seedlings Dicotyledons not identified	OO

TABLE 5 Mammal species recorded at Maggs Mountain, 1974-1976, showing relative abundance in five different habitats.

x = rare xx = uncommon xxx = common xxxx = abundant

Species	Rainforest	Wet sclerophyll forest	Dry sclerophyll forest	Plateau regeneration	Grassland and plateau clear-cut
Brush Wallaby	x	xxx	xxxx	xxx	xxxx
Tasmanian Pademelon	xx	xxxx	xx	xx	xx
Southern Potoroo		xxx	xxx		
Brush-tailed Possum	x	xxxx	xxxx	xxxx	xxx
Common Ringtail	x	xx	xx	x	
Sugar Glider	x	x	x		
Eastern Pigmy Possum		x			
Common Wombat	x	xx	xx	xx	xx
Brown Bandicoot		xx	xx		
Tiger Cat		x	x		
Tasmanian Devil		x	x		
Dusky Antechinus	xx	x			
Water Rat		x	x		
Eastern Swamp Rat	xxxx	xxxx	xxx	xxx	
Long-tailed Rat	xxx	x			xx
House Mouse		xx	xx	x	xxx
Rabbit		x	xxx	x	xxxx
Lesser Long-eared Bat			x		
Little Bat			x		
Tasmanian Pipistrelle			x		
Cat		x	x	x	x
Echidna	x	xx	xxx	xx	xx

TABLE 6 Bird species recorded in the Maggs Mountain study area, 1974-1976 giving relative abundance at the time of peak population in six habitat types. - = not present, 0 = not recorded but may be present, 1 = 1-5 in the study area, 2 = 6-20 in the study area, 3 = 1 to 2 recorded per hour, 4 = 3-5 per hour, 5 = 6-10 per hour, 6 = 11-20 per hour, 7 = 21-50 per hour, 8 = 51-100 per hour, 9 = 100 plus per hour.

Species	Rainforest	Wet sclerophyll forest	Dry sclerophyll forest	Plateau regeneration	Grassland and plateau clear-cut	River or valley swamp
Black Cormorant	-	-	-	-	-	1
White-faced Heron	-	-	0	-	0	1
Black Duck	-	-	0	-	1	1
Brown Goshawk	-	1	1	0	0	-
Wedge-tailed Eagle	0	1	1	0	0	-
Peregrine Falcon	0	1	1	0	0	-
Brown Falcon	-	0	1	0	1	-
Spotless Crake	-	-	-	-	-	2
Tasmanian Native-Hen	-	-	1	-	0	1
Masked Plover	-	-	-	-	0	1
Brush Bronzewing	-	1	1	0	0	-
Yellow-tailed Black Cockatoo	2	2	2	2	2	-
Sulphur-crested Cockatoo	1	1	1	1	1	-
Green Rosella	3	5	5	4	5	-
Blue-winged Parrot	-	-	0	-	2	-
Fan-tailed Cuckoo	0	3	4	0	0	0
Shining Bronze Cuckoo	0	4	5	3	3	0
Tawny Frogmouth	-	0	1	0	0	-
Kookaburra	-	0	2	2	0	-
Welcome Swallow	-	0	5	0	0	-
Tree Martin	-	0	6	0	4	-
Richard's Pipit	-	-	0	-	2	-
Black-faced Cuckoo-shrike	0	4	4	0	0	-
Scaly Thrush	3	3	2	0	-	-
Pink Robin	3	3	0	0	-	-
Flame Robin	-	4	7	4	6	-
Scarlet Robin	-	0	4	0	0	-
Dusky Robin	-	0	5	0	4	-
Olive Whistler	3	5	4	3	-	-
Golden Whistler	-	3	5	0	0	-
Grey Shrike-thrush	-	5	5	4	3	-
Satin Flycatcher	-	0	6	0	0	-
Grey Fantail	4	5	6	0	0	-
Spotted Quail Thrush	-	0	3	0	0	-
Superb Blue Wren	-	4	7	5	7	4
Southern Emu-wren	-	-	-	-	-	2
White-browed Scrubwren	4	5	4	3	3	0
Scrubtit	3	1	-	0	-	-
Fieldwren	-	-	-	-	2	-
Brown Thornbill	-	3	6	3	5	-
Tasmanian Thornbill	5	6	3	6	3	-
Yellow Wattlebird	3	4	7	6	3	-
Yellow-throated Honeyeater	0	6	7	7	4	-
Strong-billed Honeyeater	-	5	7	4	-	-
Black-headed Honeyeater	-	0	8	-	-	-
Crescent Honeyeater	3	6	5	4	1	-
Eastern Spinebill	4	4	6	0	0	-
Spotted Pardalote	0	0	5	0	0	-
Striated Pardalote	3	4	8	5	5	-
Silvereye	0	7	9	0	5	-
European Goldfinch	3	4	5	3	8	-
Beautiful Firetail	0	4	5	0	3	-
Common Starling	-	-	2	-	-	-
Dusky Woodswallow	-	-	5	-	-	-
Black Currawong	3	8	8	8	8	-
Forest Raven	0	3	4	3	3	0

TABLE 7 The status, seasonal occurrence and relative abundance of birds recorded in the Maggs Mountain study area from September 1975 to August 1976. T = transient, R = resident, M = interstate migrant, AM= altitudinal migrant, B = breeds locally, O = insufficient data available. The index numbers are given to indicate the relative abundance of each species as recorded on each monthly visit. - = not present, 0 = not recorded but may be present, 1 = 1-5 in the study area, 2 = 6-20 in the study area, 3 = 1-2 recorded per hour, 4 = 3-5 per hour, 5 = 6-10 per hour, 6 = 11-20 per hour, 7 = 21-50 per hour, 8 = 51-100 per hour, 9 = 100 plus per hour.

Species	Status	July	August	September	October	November	December	January	February	March	April	May	June
Black Cormorant	T	0	0	0	0	0	1	1	1	0	0	0	0
White-faced Heron	T	0	0	0	0	0	0	0	0	1	0	0	0
Black Duck	T	0	0	1	0	0	0	1	0	0	0	0	0
Brown Goshawk	OB	0	0	1	1	1	0	0	0	0	0	0	0
Wedge-tailed Eagle	RB	0	1	1	0	0	1	1	1	1	0	1	0
Peregrine Falcon	O	0	1	0	0	0	0	0	0	0	0	0	0
Brown Falcon	RB	0	0	1	1	0	0	1	1	1	0	1	1
Spotless Crake	RB	0	0	0	0	0	0	0	0	0	2	0	0
Tasmanian Native Hen	RB	1	1	0	0	1	0	1	1	1	1	1	1
Masked Plover	T	0	1	1	0	0	0	0	1	1	0	0	0
Brush Bronzewing	O	0	0	1	0	0	0	1	0	0	0	0	0
Yellow-tailed Black Cockatoo	RB	2	2	2	2	0	2	0	0	2	2	0	2
Sulphur-crested Cockatoo	RB	0	0	1	1	1	1	1	1	1	0	0	0
Green Rosella	RB	4	4	5	5	5	5	5	5	5	5	5	5
Blue-winged Parrot	M	-	-	-	-	-	-	0	2	2	0	-	-
Fan-tailed Cuckoo	MB	-	-	1	4	4	4	4	3	0	-	-	-
Shining Bronze-cuckoo	MB	-	-	0	4	5	5	4	0	0	-	-	-
Tawny Frogmouth	O	0	0	0	1	0	0	0	0	0	0	0	0
Kookaburra	RB	2	2	2	2	2	2	2	2	2	0	0	0
Welcome Swallow	MB	-	-	2	3	4	5	4	5	0	-	-	-
Tree Martin	MB	-	-	4	4	5	6	6	5	3	3	0	-
Richard's Pipit	AMB	-	-	1	0	0	1	0	2	1	0	-	-
Black-faced Cuckoo-shrike	MB	0	0	2	3	4	4	3	0	0	0	0	0
Scaly Thrush	RB	0	3	0	0	0	0	0	0	0	3	3	0
Pink Robin	RB	3	3	0	0	3	0	3	0	3	3	3	3
Flame Robin	MB	-	5	7	7	4	5	4	5	6	6	4	-
Scarlet Robin	AM	3	3	2	0	0	0	2	0	3	3	4	3
Dusky Robin	RB	4	4	4	4	4	4	5	4	4	4	5	4
Olive Whistler	RB	0	3	5	4	0	3	5	3	4	3	3	0
Golden Whistler	RB	3	3	4	5	4	5	3	3	3	3	3	0
Grey Shrike-thrush	RB	4	4	5	5	5	4	5	4	5	5	4	4
Satin Flycatcher	MB	-	-	-	0	6	6	6	6	3	0	-	-
Grey Fantail	MB	2	0	3	6	5	5	5	4	6	3	4	2
Spotted Quail-thrush	RB	0	0	0	0	0	0	0	0	3	0	3	0
Superb Blue Wren	RB	5	5	5	6	5	5	5	5	7	7	7	7
Southern Emu-wren	RB	0	0	1	0	1	2	2	2	2	2	1	1
White-browed Scrubwren	RB	5	5	5	5	5	4	4	4	5	5	5	5
Scrubtit	RB	0	0	3	3	3	0	3	3	3	0	3	0
Fieldwren	RB	0	0	0	0	0	0	2	2	2	2	2	2
Brown Thornbill	RB	5	5	6	6	4	4	4	4	5	6	6	6
Tasmanian Thornbill	RB	5	5	6	6	4	4	4	4	5	6	6	6
Yellow Wattlebird	AMB	3	4	7	5	4	5	4	5	6	3	3	3
Yellow-throated Honeyeater	RB	4	5	7	5	6	5	6	5	5	5	5	6
Strong-billed Honeyeater	RB	5	6	7	4	5	6	4	6	4	4	7	7
Black-headed Honeyeater	RB	6	6	7	7	6	6	6	8	7	7	6	7
Crescent Honeyeater	AMB	0	3	6	4	6	0	3	3	5	0	3	3
Eastern Spinebill	AMB	0	3	6	4	4	3	4	4	4	3	3	0
Spotted Pardalote	RB	4	5	4	3	3	3	3	3	4	3	3	3
Striated Pardalote	MB	0	5	7	8	6	6	5	8	6	4	0	0
Silvereye	MB	0	0	6	9	7	6	6	8	7	6	0	0
European Goldfinch	RB	5	5	4	4	4	4	4	5	5	8	4	4
Beautiful Firetail	RB	4	4	3	4	3	4	3	4	4	5	4	4
Common Starling	T	-	-	-	0	2	0	-	-	-	-	-	-
Dusky Woodswallow	MB	-	-	2	2	4	4	3	5	4	0	-	-
Black Currawong	RB	4	5	6	7	8	4	4	4	3	3	3	3
Forest Raven	RB	3	3	4	3	3	3	3	3	3	3	3	3

TABLE 8 Amphibian and reptile species recorded at Maggs Mountain, 1974-1976 showing relative abundance in five different habitats.

x = rare   xx = uncommon   xxx = common   xxxx = abundant

Species	Rainforest	Wet sclerophyll forest	Dry sclerophyll forest	Plateau regeneration	Grassland and plateau clear-cut
Brown Tree-frog	x	xxx	xxxx	xxxx	xxxx
Smooth Froglet		Borradaile Plains			
Brown Froglet	x	xxx	xxx	xxx	xxx
Tasmanian Froglet	xx	xxx	xxx	xxx	xxx
Metallic Skink		x	xxxx	x	xxxx
Spotted Skink			x		
Small-scaled Skink		x	xx	xxxx	xx
She-oak Skink		xx	xx	xx	
Southern Blue-tongue Lizard		xx	xxx	xx	xx
White-lipped Snake		xx	xxx	xx	xx
Tasmanian Tiger Snake	x	xxx	xxx	xx	xx

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